Weston & Sampson SM

westonandsampson.com

5 Centennial Drive
Peabody, MA 01960 (HQ)
tel: 978.532.1900

REPORT

JUNE 2018

TOWN OF
Grafton
MASSACHUSETTS

New DPW Facility
Application for Site Plan Review and Special Permit

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Weston & Sampson

5 Centennial Drive, Peabody, MA 01960
Tel: 978.532.1900

June 26, 2018

Mr. Joseph Laydon
Town Planner
Town of Grafton
Grafton Memorial Municipal Center
30 Providence Road
Grafton, MA 01519

Re: **Grafton DPW Facility - 48 Old Westboro Road**
Special Permit and Site Plan Written Description

Dear Mr. Laydon:

Weston & Sampson and the Town of Grafton (Town) Department of Public Works (DPW) is pleased to present this Special Permit and Site Plan Review application for a new DPW facility. The new facility is proposed at 48 Old Westboro Road. The existing DPW Facility is past its useful life, and the Town is proposing a new facility to meet its current needs. Please find provided below a description of the proposed DPW facility:

- The proposed site is currently undeveloped land located on a 46.99-acre lot owned by the Town of Grafton. The Town is proposing to use approximately 6.4-acres of this lot for the new facility. The site's main building will be approximately 33,800 square feet (SF), which provides space for administrative functions, employee facilities, workshops, vehicle maintenance, vehicle wash, and vehicle/equipment storage. The site will also have a 4,800 SF hi-arch gambrel timber framed salt shed, a diesel vehicle fueling system, outside material bulk storage bins, a public recycling drop off area, and stormwater control and treatment features. The project will include several bid alternates, which will be subject to available funding. The bid alternates will include: an approximate 4,520 SF addition to the vehicle/equipment storage garage, a fuel island canopy with fire suppression, a salt shed canopy and select vehicle maintenance equipment.

- The Facility currently has twelve (12) employees consisting of two (2) Mechanics, nine (9) Highway Department employees, and one (1) Superintendent. The typical hours of operation for the facility, and all employees, are Monday through Friday, 7:00am to 3:30pm. However, one of the duties of the DPW is to conduct snow and ice fighting operations during winter months. During snow/ice fighting events, DPW employees may be required to work throughout the night, where they will be mostly out on the road plowing and salting, with periodic trips back to the facility for fuel and salt. The DPW employees will also work overtime as needed to respond to emergencies related to infrastructure repair and public safety.

- The Facility will be expected to receive periodic bulk deliveries of salt, propane and diesel fuel for the onsite salt shed, propane heating system, and vehicle fueling system respectively. The salt shed is sized to hold about one year's worth of salt, which equates to about 2,900 tons of salt. The shed will be filled during non-winter months utilizing trailer trucks, and it is estimated that about 140 trailer truck salt deliveries will be made during the off-season. The deliveries will be spread out and made during off-peak traffic hours, to help prevent any impacts to traffic. During the winter months, the salt that is used will be replenished if needed. Winter deliveries will also be spread out and made during off-peak traffic hours. For propane, deliveries are expected every 3-4 weeks during the winter months, with less frequent deliveries for the rest of the year. The facility will receive diesel fuel deliveries approximately monthly throughout the winter, with less frequent orders during the spring, summer and fall.

- Approximately twenty residents per day will use the public recycling drop off area during weekdays, with up to fifty residents on a Saturday. The recycling containers in the drop off area will be swapped out about once per week.

- The Facility will have a fluids storage room equipped with a concrete floor sloped to a concrete sump to provide containment for hazardous materials. The fluid storage room will have bulk storage fluid containers that range from 280 gallon tanks to 55 gallon drums for the following fluids: 5W-40 engine oil, 5W-20 Engine oil, hydraulic oil, automatic transmission fluid, anti-freeze, and other typical vehicle maintenance fluids. These fluids will be used for the maintenance of the fleet, and will be restricted to the fluid storage room and vehicle/equipment maintenance areas within the building. All areas within the building where hazardous materials are either used or stored will be equipped with concrete floors sloped to either a containment sump or to floor drains which will discharge to an oil water separator and then to an underground double-walled industrial wastewater tight tank. The double-walled tight tank will be fiberglass for corrosion resistance, and will be equipped with continuous electronic monitoring of the tank interstitial space for leaks. In addition, the tank will be registered with the Department of Environmental Protection (DEP) and will meet or exceed all DEP requirements.

- A 5,000 gallon double-walled aboveground diesel tank will also be utilized to fuel Town vehicles. This tank will be double-walled impact resistant steel, and will include continuous electronic monitoring of the interstitial space for leaks. The diesel fueling system will be designed and constructed in accordance with DEP regulations and the Massachusetts Comprehensive Fire Safety Code.

- The proposed facility does not have any significant potential for future changes except for the possibility of expansion of the vehicle storage garage. As an example, the DPW currently has one employee for every 10 miles of road, as such there is no reason to expect more than an increase in two to four employees over the next thirty years, and capacity to accommodate these employees is built into the facility. The base bid for the project includes a 29,280 SF building. As mentioned above, there is a bid alternate to provide an addition to the vehicle storage garage which would add 4,520 SF, giving a total building footprint under this project of 33,800 SF. Also, if needed in the future, the site has been designed to accommodate another addition to the vehicle storage garage in the amount of 5,500 SF. The limits of the possible vehicle storage garage expansion are shown on the site plan.

A request for a waiver to the Planning Department Hydrological Study requirements is attached, as the more stringent Conservation Commission Hydrological Study requirements were met with the application for a Stormwater Management Permit, submitted on June 19th. In addition, a variance for the Salt Shed height will be submitted to the Zoning Board of Appeals, along with separate permit applications to the Board of Health for the water supply well and the septic system.

The attached application was prepared in accordance with the standards and recommendations provided in the Town of Grafton Zoning By-laws (By-laws), with the exception of the Salt Shed height and the Hydrological Study, which meets the more stringent Conservation Commission requirements, as described above. If you have any questions or would like to discuss this further, please do not hesitate to contact Mr. James Fair at (978) 532-1900, ext. 2334, or Mr. Andy Deschenes at 508-839-5335.

Sincerely,

WESTON & SAMPSON ENGINEERS, INC.

James R. Fair, P.E.
Team Leader / Project Manager

TOWN OF GRAFTON

Andy Deschenes
DPW Project Manager

Appendix A

Waiver Request
Completed Application Forms
Written Statements
Certificate of Good Standing
Certified Abutters list

5 Centennial Drive., Peabody, MA 01960
Tel: 978.532.1900

Grafton DPW Facility - 48 Old Westboro Road

Waiver Request

In addition to this Application for Site Plan Approval and a Special Permit, we have applied for a Stormwater Management Permit, through the Conservation Commission. As discussed at the pre-submission meeting, the Storm Water Management Hydrological Study required by the Conservation Commission is stricter than the Hydrological Study required by the Planning Department Site Plan Approval/Special Permit. Because the Hydrological Study submitted to the Conservation Commission meets or exceeds the requirements of Planning Department, we are requesting a waiver from the Stormwater Management Hydrological Study requirement listed in Section 1.3.3.3 (e) of the Grafton Zoning By-laws. All other requirements will be addressed in this application. Two copies of the Conservation Commission Stormwater Management Permit Hydrological Study are included with our planning board application to be part of the record.

TOWN OF GRAFTON
GRAFTON MEMORIAL MUNICIPAL CENTER
30 PROVIDENCE ROAD
GRAFTON, MASSACHUSETTS 01519
(508) 839-5335 ext 1120 • FAX (508) 839-4602
planningdept@grafton-ma.gov
www.grafton-ma.gov

PLANNING DEPARTMENT

APPLICATION FOR SITE PLAN APPROVAL

Application No. _____

APPLICANT NAME: Town of Grafton

STREET 30 Providence Road CITY/TOWN Grafton

STATE MA ZIP 01519 TELEPHONE 508-839-5335

PROPERTY OWNER NAME: Town of Grafton

STREET 30 Providence Road CITY/TOWN Grafton

STATE MA ZIP 01519 TELEPHONE 508-839-5335

Deed recorded in the Worcester District Registry of Deeds Book 30447 Page 60

CONTACT PERSON'S NAME: Andy Deschenes, DPW Project Manager

TELEPHONE 508-839-5335

SITE INFORMATION:

STREET AND NUMBER 48 Old Westboro Road

ZONING DISTRICT R40 ASSESSOR'S MAP 48 LOT #(S) 12

LOT SIZE 46.99 Acres FRONTAGE 1705 ft

CURRENT USE undeveloped brush land/ successional forest

PLAN INFORMATION:

PLAN TITLE Town of Grafton, DPW Facility

PREPARED BY Weston & Sampson Engineers, Inc.

DATE PREPARED 6/22/2018 REVISION DATE _____

Describe proposed changes / additions: _____

TO THE GRAFTON PLANNING BOARD:

The undersigned, being the APPLICANT named above, hereby applies for approval of the above entitled SITE PLAN by the Planning Board and certifies that, to the best of APPLICANT'S knowledge and belief, the information contained herein is correct and complete and that said PLAN conforms with the requirements of the Zoning By-Law of the Town of Grafton.

Applicant's Signature _____ Date: 6/25/18

Property Owner's Signature (if not Applicant) _____ Date: _____

PLANNING DEPARTMENT

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www.grafton-ma.gov

APPLICATION FOR SPECIAL PERMIT

Application No. _____

APPLICANT & PROPERTY OWNER INFORMATION

NAME Town of Grafton

STREET 30 Providence Road CITY/TOWN Grafton

STATE MA ZIP 01519 TELEPHONE 508-839-5335

NAME OF PROPERTY OWNER (if different from Applicant) _____

Deed recorded in the Worcester District Registry of Deeds Book 30447 Page 60

SITE INFORMATION:

STREET AND NUMBER 48 Old Westboro Road

ZONING DISTRICT R40 ASSESSOR'S MAP 48 LOT #(S) 12

LOT SIZE 46.99 Acres FRONTAGE 1705 ft

CURRENT USE undeveloped brush land/ successional forest

PROJECT/PLAN INFORMATION:

PLAN TITLE Town of Grafton, DPW Facility

PREPARED BY (name/address of PE/Architect) Weston & Sampson Engineers, 5 Centennial Dr., Peabody, MA 01960

DATES 6/22/2018

Use for which Special Permit is sought: (refer to § 3.2.3.1 of the Zoning Bylaw - Use Regulation Table):

Municipal Uses Voted by Town Meeting

Public Storage area or Buildings such as those for road salt and sand and municipal vehicles

Cite all appropriate sections of the Zoning By-Law which pertain to this Application, Use and Site:

Sections: 1, 2.1, 3.1, 3.2, 3.3, 4.1, 4.2, and 8.

TO THE GRAFTON PLANNING BOARD:

The undersigned, being the APPLICANT named above, hereby applies for a SPECIAL PERMIT to be granted by the Planning Board and certifies that, to the best of APPLICANT'S knowledge and belief, the information contained herein is correct and complete.

Applicant's Signature _____ Date: 6/25/18

Property Owner's Signature (if not Applicant) _____ Date: _____

Weston & Sampson

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Tel: 978.532.1900

MEMORANDUM

TO: Grafton Planning Board

FROM: James Fair (Engineer) and Paul Cournoyer (Applicant)

DATE: June 22, 2018

SUBJECT: Compliance Statements for Grafton DPW Submission

As the engineer of record, I certify that the buildings and site included in this submission for the Grafton DPW Highway Facility have been designed to comply with the performance standards set forth in Section 4.1 of the Zoning By-Law.

James Fair, P.E.

Weston & Sampson Engineers, Inc.

As the applicant, I certify that the buildings and site included in this submission for the Grafton DPW Highway Facility will be maintained, and the activities on the site will be conducted in accordance with the performance standards set forth in Section 4.1 of the Zoning By-Law.

Paul Cournoyer,

Grafton DPW Director

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GRAFTON, MASSACHUSETTS 01519
Phone: (508) 839-5335 ext 1170 • FAX: (508) 839-4602
www.grafton-ma.gov

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MAR 2 9 2018

TREASURER / COLLECTOR

Certificate of Good Standing

Applicants seeking permits with the Town of Grafton must submit this completed form at the time of application. When all obligations are paid to date, you must attach this "Certificate of Good Standing," with your application. Delinquent bills must be paid in full before the appropriate department accepts your application. Please make arrangements to pay these outstanding bills at the Collector's Office.

Please note: it can take up to three (3) business days to process each request.

Please check all that apply and indicate if permit(s) have been issued.

	Permit Issued? Yes	No		Permit Issued? Yes	No
❑Building – Inspection(s)		✔	❑Septic System		✔
❑Building – Electric		✔	❑Conservation		✔
❑Building – Plumbing		✔	❑Planning		✔
❑Board of Health		✔	❑Other		✔

Other Permit: _____

Weston & Sampson Engineers- Mel Higgins
Petitioner Name

5 Centennial Drive
Petitioner Address

Peabody, MA, 01960
City, State, Zip

978-532-1900 ext.2332
Phone

Town of Grafton
Property Owner / Company Name

30 Providence Road
Property Address

Grafton, MA
City, State, Zip

Date:	Current	Delinquent	N/A
Real Estate			✓
Personal Property			✓
Motor Vehicle Excise			✓
Disposal	✓		
General Billing			✓

J. HAFFTY — Treasurer / Collector ~~Name~~ (please print) — Office

J Hafftey — Treasurer / Collector Signature — Office

3/29/18 — Date

Form Revised: 01/22/2014

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BOARD OF ASSESSORS

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MAY - 2

GRAFTON
ASSESSORS

Request for Abutters List

Date of Request: 5/2/2018 Date List Needed: 5/21/2018

Requested by: Tyler Cofelice Phone: 978-977-0110 x 2299

Name of Property Owner: Town of Grafton

Street Address of Property: 48 Old Westboro Road, Grafton MA, 01519

Map: 39 48 Block: _____ Lot: 12

REASON FOR LIST:

Hearing before the Zoning Board of Appeals	Yes ✔	No _____
Hearing before the Planning Board	Yes ✔	No _____
Hearing before the Conservation Commission	Yes ✔	No _____

Other: _____

REASON FOR HEARING - (please check)

Variance ✔ Scenic Road _____ Title 5 _____ Special Permit ✔ Subdivision _____

Other: _____

RADIUS FOR ABUTTERS - (please check one)

Immediate _____ 300 Feet ✔ Upon, along, across or under: _____

LABELS

Two Sets of Labels will be provided if needed: Yes ✔ No _____
(Planning Board requires 2 sets of Labels)

Office Use Only

Date List Prepared: 5-3-18 Address Labels Prepared: 5-3-18

Fee Charged: $ 0 Amt. Paid: _____ $ Date: 5-2-18

Check: # _____ Cash: $ _____ Money Order: $ _____

Revised: 1/22/2014

5/3/2018

48 Old Westboro Road
Map 48, Lot 12

Tammy Kalinowski, Office Manager

PARCEL ID	LOCATION	OWNER 1	OWNER 2	ADDRESS 1	ADDRESS 2	CITY	ST	ZIP	BK	PG
110/031.0-0000-0015.0	94 OLD WESTBORO ROAD	FOSSUM GRAFTON FARM INC		94 OLD WESTBORO ROAD		N GRAFTON	MA	01536	47188	242
110/039.0-0000-0001.0	77 OLD WESTBORO ROAD	DONAHUE TODD D	DONAHUE AMY BETH	77 OLD WESTBORO ROAD		N GRAFTON	MA	01536	26685	0003
110/039.0-0000-0004.0	59 OLD WESTBORO ROAD	KNOWLTON PATRICIA K TRUSTEE	KNOWLTON FARMS NOMINEE TRUST	43 ESTABROOK AVENUE		GRAFTON	MA	01519	35401	344
110/039.0-0000-0005.0	69 OLD WESTBORO ROAD	BOISVERT JAMES M		69 OLD WESTBORO ROAD		N GRAFTON	MA	01536	53740	335
110/039.0-0000-0006.0	71 OLD WESTBORO ROAD	NOGUERA ENERIA	GALVIS RICHARD	71 OLD WESTBORO ROAD		N GRAFTON	MA	01536	39427	26
110/039.0-0000-0008.0	65 OLD WESTBORO ROAD	FEDERAL NATIONAL MORTGAGE		P.O. BOX 650043		DALLAS	TX	75265	57833	384
110/039.0-0000-0009.0	7 STOCKWELL FARM ROAD	COOLBAUGH BRIAN L		7 STOCKWELL FARM ROAD		N GRAFTON	MA	01536	34836	78
110/039.0-0000-0010.0	63 OLD WESTBORO ROAD	STEINBERG MARSHA KNOWLTON		12515 REVERENCE WAY		CYPRESS	TX	77429	35544	379
110/040.0-0000-0001.0	79 OLD WESTBORO ROAD	OFTEN MATHEW	OFTEN LAURA	79 OLD WESTBORO ROAD		N GRAFTON	MA	01536	42441	253
110/040.0-0000-0002.0	88 OLD WESTBORO ROAD	HARRINGTON JOHN C JR	TEBO GAIL A	DAVID D. DYSZKO LIFE ESTATE	86 OLD WESTBORO ROAD	N GRAFTON	MA	01536	22618	338
110/040.0-0000-0003.0	86 OLD WESTBORO ROAD	TEBO GAIL ANN	HARRINGTON JOHN C JR	86 OLD WESTBORO ROAD		N GRAFTON	MA	01536	17032	55
110/040.0-0000-0004.A	78 OLD WESTBORO ROAD	FRAUMENI ALFRED		354 MAIN STREET		WAKEFIELD	MA	01880	42275	355
110/040.0-0000-0004.C	84 OLD WESTBORO ROAD	NIRO DANA H	HENDERSON CRYSTAL	82 OLD WESTBORO ROAD		N GRAFTON	MA	01536	50505	113
110/040.0-0000-0006.0	81 OLD WESTBORO ROAD	BROWNE MARK		85 OLD WESTBORO ROAD		N GRAFTON	MA	01536	11508	230
110/040.0-0000-0007.0	85 OLD WESTBORO ROAD	BROWNE MARK S	BROWNE CAROLYN A	85 OLD WESTBORO ROAD		N GRAFTON	MA	01536	15131	267
110/040.0-0000-0008.0	7 STOCKWELL FARM ROAD	COOLBAUGH BRIAN L		7 STOCKWELL FARM ROAD		N GRAFTON	MA	01536	34836	78
110/048.0-0000-0011.0	55 OLD WESTBORO ROAD	KNOWLTON PATRICIA K TRUSTEE	KNOWLTON FARMS NOMINEE TRUST	43 ESTABROOK AVENUE		GRAFTON	MA	01519	35401	337
110/048.0-0000-0017.0	38 OLD WESTBORO ROAD	KNOWLTON PATRICIA K TRUSTEE	KNOWLTON FARMS NOMINEE TRUST	43 ESTABROOK AVENUE		GRAFTON	MA	01519	35401	337
110/048.0-0000-0020.0	37 OLD WESTBORO ROAD	KLOCEK GREGORY M	KLOCEK ALICIA	37 OLD WESTBORO ROAD		GRAFTON	MA	01519	49249	350
110/048.0-0000-0021.0	39 OLD WESTBORO ROAD	KLOCEK JESSICA L		39 OLD WESTBORO ROAD		GRAFTON	MA	01519	35401	342
110/048.0-0000-0022.0	41 OLD WESTBORO ROAD	STEINBERG MARSHA KNOWLTON		12515 REVERENCE WAY		CYPRESS	TX	77429	35401	344
110/049.0-0000-0001.0	43 ESTABROOK AVENUE	KNOWLTON PATRICIA K TRUSTEE	KNOWLTON FARMS NOMINEE TRUST	43 ESTABROOK AVENUE		GRAFTON	MA	01519	35401	337
110/049.0-0000-0001.A	43 ESTABROOK AVENUE	KNOWLTON PATRICIA K TRUSTEE	KNOWLTON FARMS NOMINEE TRUST	43 ESTABROOK AVENUE		GRAFTON	MA	01519	35401	337
110/049.0-0000-0001.B	21 ESTABROOK AVENUE	KNOWLTON PATRICIA K TRUSTEE	KNOWLTON FARMS NOMINEE TRUST	SUNEDISON - ATTN BRIANNA BALES	13736 RIVER PORT DRIVE, SUITE 100(	MARYLAND HEIGHTS	MO	63043	35401	337
110/049.0-0000-0006.0	44 ESTABROOK AVENUE	KNOWLTON PATRICIA K TRUSTEE	KNOWLTON FARMS NOMINEE TRUST	43 ESTABROOK AVENUE		GRAFTON	MA	01519	35401	337

FOSSUM GRAFTON FARM INC
94 OLD WESTBORO ROAD
N GRAFTON, MA 01536

DONAHUE TODD D
DONAHUE AMY BETH
77 OLD WESTBORO ROAD
N GRAFTON, MA 01536

KNOWLTON PATRICIA K TRUSTEE
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43 ESTABROOK AVENUE
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GALVIS RICHARD
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FEDERAL NATIONAL MORTGAGE
P.O. BOX 650043
DALLAS, TX 75265

COOLBAUGH BRIAN L
7 STOCKWELL FARM ROAD
N GRAFTON, MA 01536

STEINBERG MARSHA KNOWLTON
12515 REVERENCE WAY
CYPRESS, TX 77429

OFTEN MATHEW
OFTEN LAURA
79 OLD WESTBORO ROAD
N GRAFTON, MA 01536

HARRINGTON JOHN C JR
TEBO GAIL A
DAVID D. DYSZKO LIFE ESTATE
86 OLD WESTBORO ROAD
N GRAFTON, MA 01536

TEBO GAIL ANN
HARRINGTON JOHN C JR
86 OLD WESTBORO ROAD
N GRAFTON, MA 01536

FRAUMENI ALFRED
354 MAIN STREET
WAKEFIELD, MA 01880

NIRO DANA H
HENDERSON CRYSTAL
82 OLD WESTBORO ROAD
N GRAFTON, MA 01536

BROWNE MARK
85 OLD WESTBORO ROAD
N GRAFTON, MA 01536

BROWNE MARK S
BROWNE CAROLYN A
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KLOCEK GREGORY M
KLOCEK ALICIA
37 OLD WESTBORO ROAD
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SUNEDISON - ATTN BRIANNA BALES
13736 RIVER PORT DRIVE, SUITE 1000
MARYLAND HEIGHTS, MO 63043

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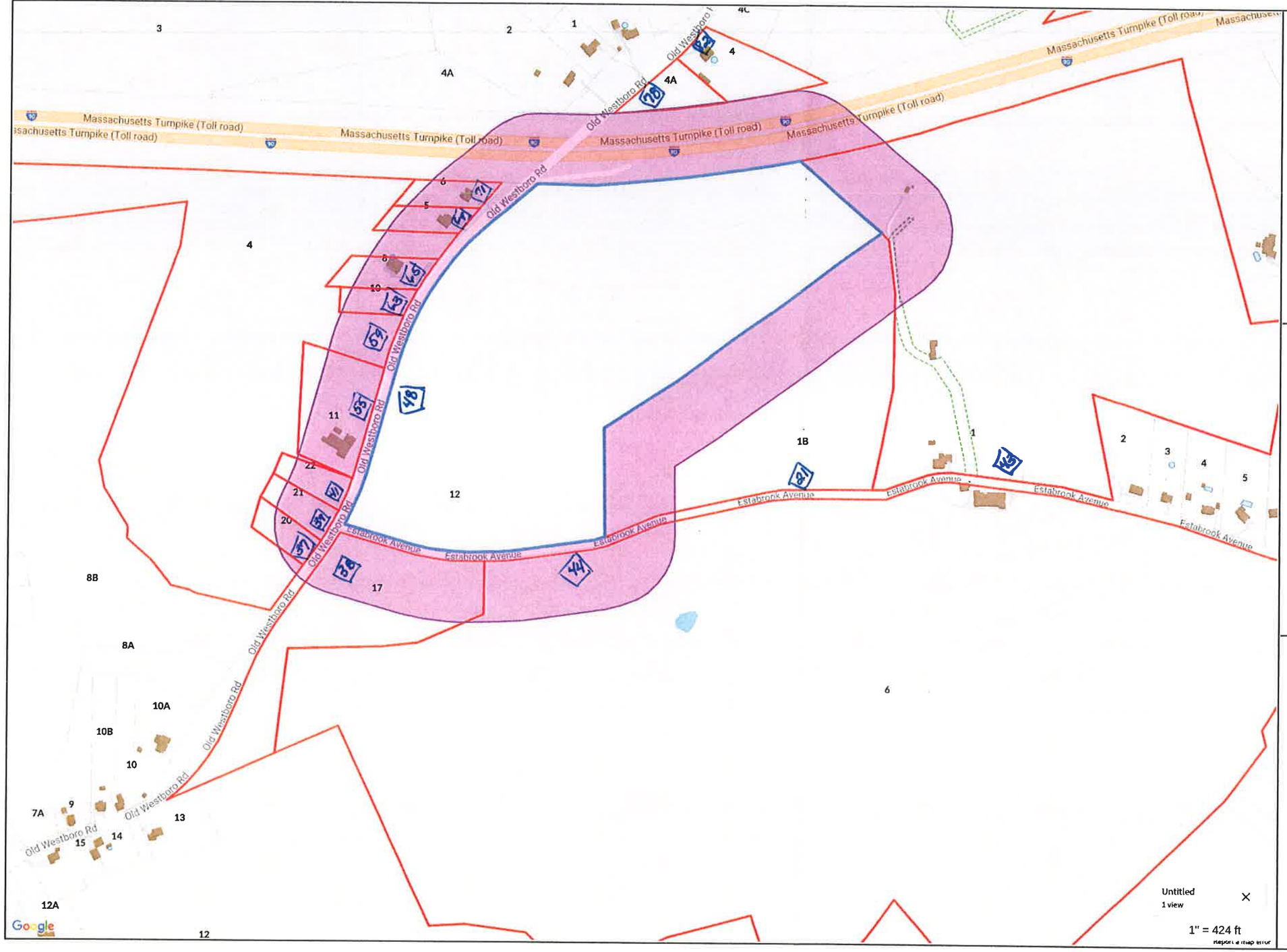
43 ESTABROOK AVENUE
GRAFTON, MA 01519

KNOWLTON PATRICIA K TRUSTEE
KNOWLTON FARMS NOMINEE TRUST
SUNEDISON - ATTN BRIANNA BALES
13736 RIVER PORT DRIVE, SUITE 1000
MARYLAND HEIGHTS, MO 63043

KNOWLTON PATRICIA K TRUSTEE
KNOWLTON FARMS NOMINEE TRUST
43 ESTABROOK AVENUE
GRAFTON, MA 01519

Town of Grafton, MA

May 3, 2018



Property Information

Property ID 110/048.0-0000-0012.0
Location 48 OLD WESTBORO ROAD
Owner GRAFTON TOWN OF

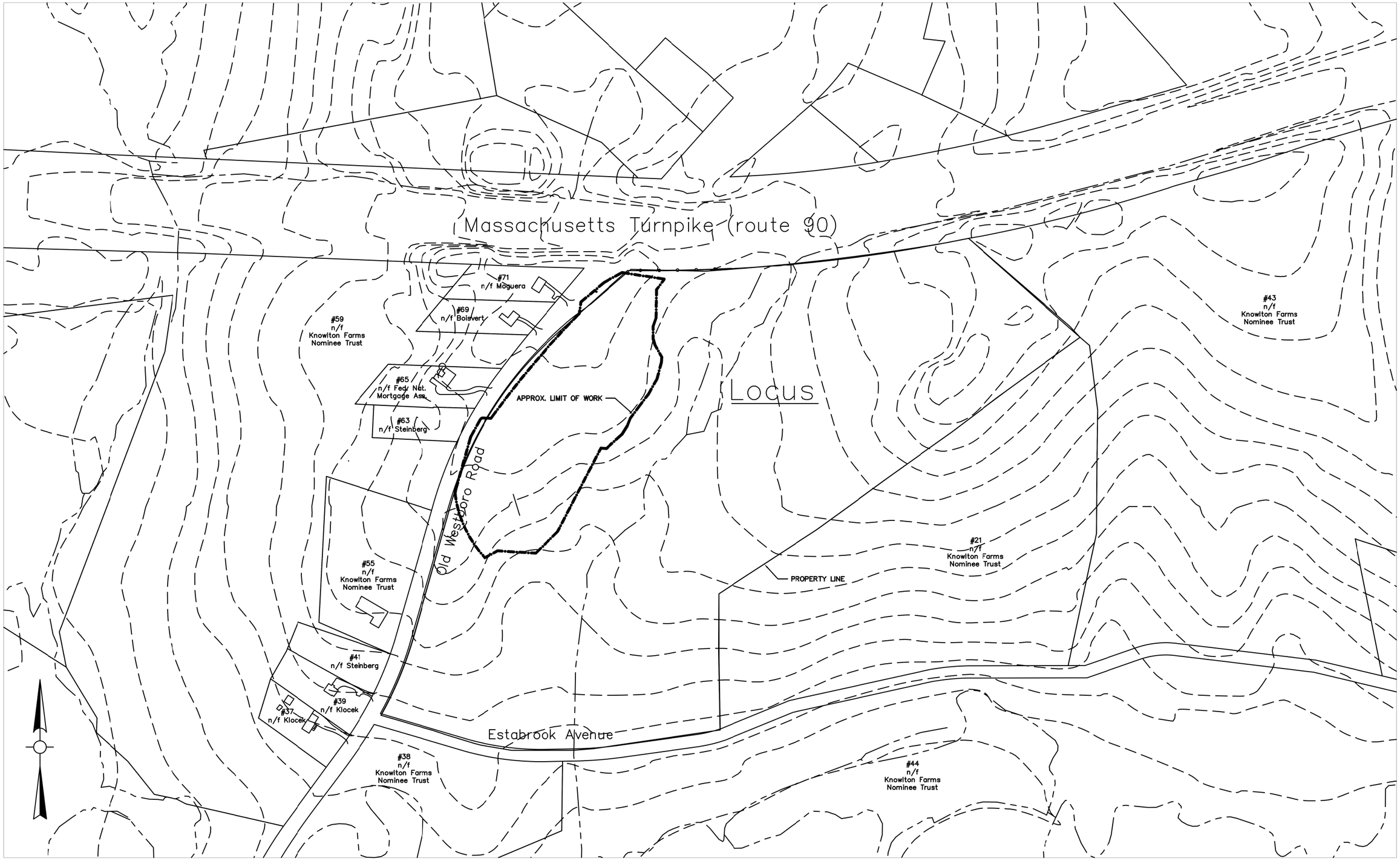
MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Grafton, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 4/1/2018
Properties updated 4/1/2018

Appendix B

Locus Map
Rendering of Site



Locus Map

1"=300'

from oliver gis layers, approximate

300 150 0 300 600

SCALE: 1"=300'

Grafton, MA
Department of Public Works
Rendering No. 1

Weston & Sampson SM

Grafton, MA
Department of Public Works
Rendering No. 2

Weston & Sampson SM

Grafton, MA
Department of Public Works
Rendering No. 3

Weston & Sampson SM

Appendix C

Environmental Protection
Specifications Section

SECTION 01 57 19

ENVIRONMENTAL PROTECTION

PART 1 – GENERAL

1.01 DESCRIPTION:

A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.

B. The requirements set forth in this section of the specifications apply to construction in and adjacent to wetlands, unless otherwise specifically stated.

C. All work under this Contract shall be in accordance with the Conservation Commissions' Orders of Conditions as well as any conditional requirements applied, all of which are attached to Section 00 31 43, PERMITS.

D. Prior to commencement of work, the Contractor shall meet with representatives of the Engineer to develop mutual understandings relative to compliance of the environmental protection program.

1.02 SUBMITTALS:

A. The Contractor shall submit for approval details and literature fully describing environmental protection methods to be employed in carrying out construction activities adjacent to the 100 foot wetland buffer.

PART 2 – PRODUCTS

2.01 SILT FENCE:

A. The silt fence shall consist of a 3-foot wide continuous length sediment control fabric, stitched to a mesh backing, and stapled to preweathered oak posts installed as shown on the drawings. The oak posts shall be 1-1/4-inches by 1-1/4-inches (Minimum

Dimension) by 48-inches and shall be tapered. The bottom edge of the silt fence shall be buried as shown on the drawings.

B. The silt fence shall be DOT Silt Fence PPDM3611, as manufactured by U.S. Silt & Site Supply/Getsco, Concord, NH, or approved equal.

C. Silt fence properties:

Physical Properties	Test Method	Minimum Value
Grab Strength, lbs.	ASTM-D-4632	124
Grab Elongation, %	ASTM-D-4632	15
Mullen burst, psi	ASTM-D-3786	300
Puncture, lbs.	ASTM-D-4833	65
Trapezoidal Tear, lbs.	ASTM-D-4833	65
UV Resistance2, %3	ASTM-D-4355	80@500 hrs.
AOS, US Sieve No.	ASTM-D-4751	30
Flow Rate, gal/min/sq ft	ASTM-D-4491	10
Permittivity, (1/sec) gal/min/sq ft	ASTM-D-4491	0.05 sec^{-1}

2.02 COMPOST FILTER TUBES:

A. Compost filter tubes shall be a tubular filter sock of mesh fabric. The fabric will have openings of between 1/8" to ¼" diameter. The mesh material will either photo degrade within one year or be made of nylon with a life expectancy of 24 months. The sock shall be filled with a mix of composted leaf mulch, bark mulch and wood chips that have been composted for at least one year. The sock will have a minimum diameter of 12-inches.

PART 3- EXECUTION

3.01 NOTIFICATION AND STOPPAGE OF WORK:

A. The Engineer will notify the Contractor in writing of any non-compliance with the provisions of the Order of Conditions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails to act promptly, the Owner may order stoppage of all or part of the work through the Engineer until satisfactory corrective action has been taken. No claim for an extension of time or for excess costs or damage

incurred by the Contractor as a result of time lost due to any stop work orders shall be made unless it was later determined that the Contractor was in compliance.

3.02 AREA OF CONSTRUCTION ACTIVITY:

A. Insofar as possible, the Contractor shall confine his construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work under this contract.

3.03 PROTECTION OF WATER RESOURCES:

A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the Contractor's responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.

B. Special measures should be taken to insure against spillage of any pollutants into public waters.

3.04 CONSTRUCTION IN AREAS DESIGNATED AS WETLANDS ON THE DRAWINGS:

A. Insofar as possible, the Contractor shall make every effort to minimize disturbance within areas designated as wetlands or within 100-feet of wetland resource areas.

B. The Contractor shall perform his work in such a way that these areas are left in the condition existing prior to construction.

3.05 PROTECTING AND MINIMIZING EXPOSED AREAS:

A. The Contractor shall limit the area of land which is exposed and free from vegetation during construction. In areas where the period of exposure will be greater than two (2) months, temporary vegetation, mulching or other protective measures shall be provided as specified.

B. The Contractor shall take account of the conditions of the soil where temporary cover crop will be used to insure that materials used for temporary vegetation are adaptive to the sediment control. Materials to be used for temporary vegetation shall be approved by the Engineer.

3.06 LOCATION OF STORAGE AREAS:

A. The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared as a part of this project, and

shall require written approval of the Engineer. Plans showing storage facilities for equipment and materials shall be submitted for approval of the Engineer.

B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of one hundred (100) feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control such as the placement of compost filter tubes around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.

C. There shall be no storage of equipment or materials in areas designated as wetlands.

D. The Engineer may designate a particular area or areas where the Contractor may store materials used in his operations.

3.07 PROTECTION OF LANDSCAPE:

A. The Contractor shall not deface, injure, or destroy trees or shrubs nor remove or cut them without written authority from the Owner. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized by the Engineer. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees which are not to be removed, particularly overhanging branches and limbs. The Contractor shall, in any event, be responsible for any damage resulting from such use.

B. Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. When there is unavoidable injury to branches, limbs and trunks of trees, the injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.

C. Where, in the opinion of the Engineer, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by his blasting or other operations, the Engineer may require the Contractor to adequately protect such trees by placing boards, planks, poles or fencing around them. Any trees or landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the expense of the Contractor. The

Engineer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of.

3.08 CLEARING AND GRUBBING:

A. The Contractor shall clear and grub only on the Owner's land or the Owner's easements, and only the area required for construction operations, as approved by the Engineer.

B. The Contractor shall not remove trees in the Owner's temporary easements without permission of the Engineer.

3.09 DISCHARGE OF DEWATERING OPERATIONS:

A. Any water that is pumped and discharged from the trench and/or excavation as part of the Contractor's water handling shall be filtered by an approved method prior to its discharge into a receiving water or drainage system.

B. Under no circumstances shall the Contractor discharge water to the areas designated as wetlands.

C. The pumped water shall be filtered through filter fabric and baled straw, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than 1 foot per second. Accumulated sediment shall be cleared from the channel periodically.

3.10 DUST CONTROL:

A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, to minimize creation and dispersion of dust. If the Engineer decides it is necessary to use calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed.

B. Calcium Chloride shall not be used for dust control within a drainage basin or in the vicinity of any source of potable water.

3.11 SEPARATION AND REPLACEMENT OF TOPSOIL:

A. Topsoil shall be carefully removed where excavations are to be made, and separately stored to be used again as directed. The topsoil shall be stored in an area acceptable to

the Engineer and adequate measures shall be employed to prevent erosion of said material.

3.12 COMPOST FILTER TUBES:

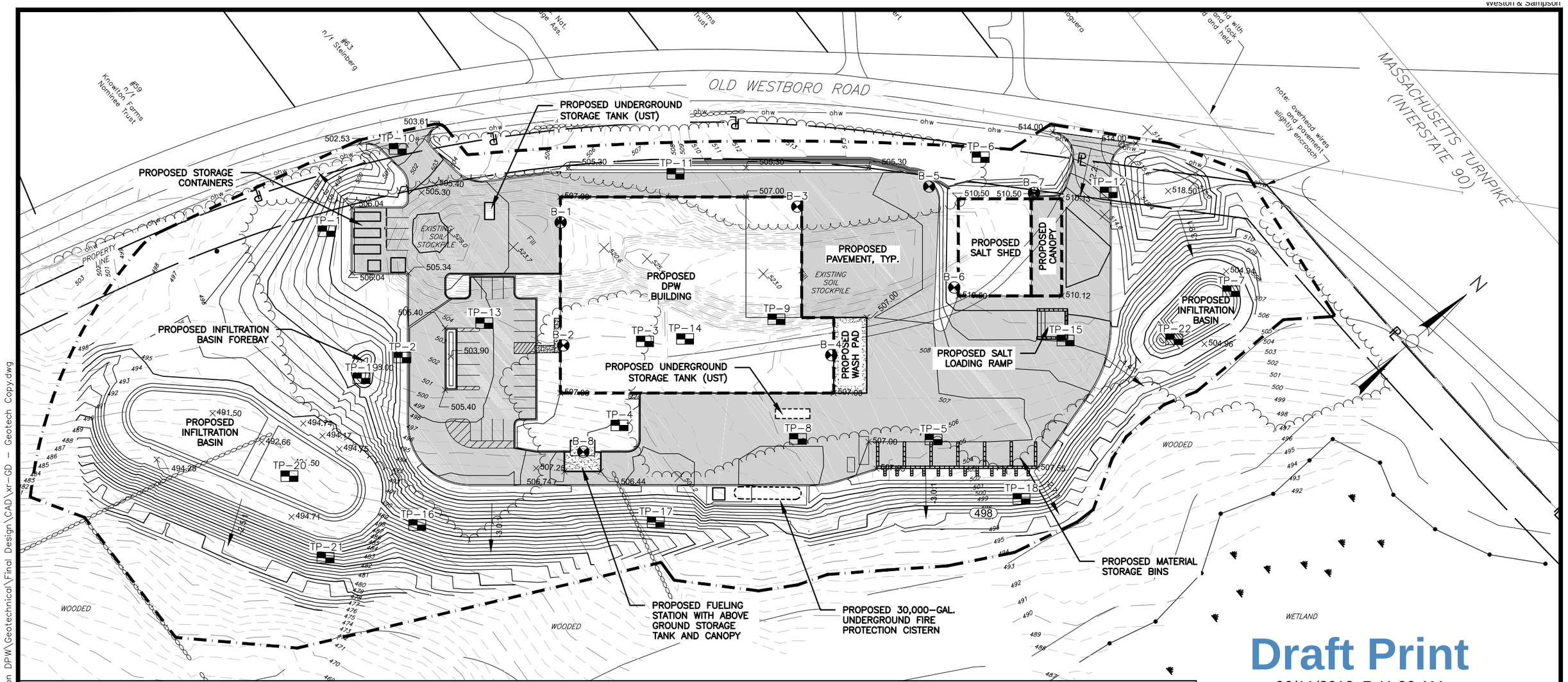
A. The compost filter tubes will be staked in the ground using wooden stakes driven at 4-foot intervals. The wooden stakes will be placed at a minimum depth of 24-inches into the ground.

END OF SECTION

P:\MA\Grafton, MA\2180199 Grafton DPW\Permits\0_Applications for Permits\Con Com SW Permit Package\6_ Stormwater Management Plan\Stormwater Report\Working Docs\01 57 19 Environmental Prot.docx

Appendix D

Test Pit Logs and Locations



PLAN NOTES:

1. EXISTING SITE CONDITIONS ARE BASED ON A TOPOGRAPHIC SURVEY CONDUCTED BY LAND PLANNING INC. OF GRAFTON, MA ON MAY 3, 2018. ELEVATIONS ARE IN FEET AND REFERENCE AN UNKNOWN VERTICAL DATUM (TO BE DETERMINED).
2. ELEVATIONS AT AND AROUND THE EXISTING STOCKPILE HAVE CHANGED SINCE THE TIME OF THE SITE SURVEY COMPLETED ON MAY 3, 2018. EXISTING TOPOGRAPHIC CONTOUR LINES SHOWN ON THIS PLAN MAY NOT REFLECT CURRENT CONDITIONS.
3. PROPOSED SITE CONDITIONS ARE BASED ON WORKING DESIGN PLANS PREPARED BY WESTON & SAMPSON ENGINEERS, LAST REVISED JUNE 7, 2018.
4. TEST PITS TP-1 THROUGH TP-9 WERE COMPLETED ON NOVEMBER 20, 2014 AS PART OF THE PRELIMINARY DESIGN PHASE. TEST PITS TP-10 THROUGH TP-22 WERE COMPLETED ON MAY 8 AND 9, 2018. ALL TESTS PITS WERE EXCAVATED BY THE TOWN OF GRAFTON, MA.
5. ALL BORINGS (B-1 THROUGH B-8) WERE COMPLETED BY TECHNICAL DRILLING SERVICES OF STERLING, MA ON MAY 16-18, 2018.
6. EXPLORATION LOCATIONS WERE LOCATED AND RECORDED WITH GLOBAL POSITIONING SYSTEM (GPS) UNIT.
7. WESTON & SAMPSON OBSERVED ALL EXPLORATION ACTIVITIES IN THE FIELD AND RECORDED EACH EXPLORATION LOCATION WITH A HANDHELD GPS UNIT.

EXPLORATION LEGEND:

B-1 — BORING DESIGNATION AND APPROXIMATE LOCATION.

TP-1 — TEST PIT DESIGNATION AND APPROXIMATE LOCATION.

80 40 0 80 160

SCALE: 1"=80'

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NOT FOR CONSTRUCTION

FIGURE 1

TOWN OF GRAFTON, MASSACHUSETTS
NEW DEPARTMENT OF PUBLIC WORKS (DPW) FACILITY

SITE PLAN

DESIGNED BY:TJB	CHECKED BY:CJP	DATE: JUNE 2018

Weston & Sampson℠

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TEST PIT LOG

PROJECT NAME/NO.	Grafton DPW - 2140353.C			**TEST PIT NUMBER**	
LOCATION	Old Westboro Road			TP-1	
CLIENT	Town of Grafton			GROUND SURFACE	
CONTRACTOR	Town of Grafton	FOREMAN:	Damion/Joe	ELEVATION	El. 499 +/-
OBSERVED BY	Julie A. Eaton	DATE	11/20/14	DEPTH TO GROUNDWATER	
CHECKED BY	Chris Palmer, PE	DATE	12/1/14		Not encountered.

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Grass and light forest debris.	
	Dark brown, SILTY SAND FILL with little organics (roots); moist.	**TOPSOIL (6 in.)**
1	Gray-brown, gravelly, fine to medium SAND FILL with some silt, and common cobbles and boulders (up to 24 in. diameter) and trace organics (roots); moist.	
2		
3	- without organics at approximately 24 in.	**SAND FILL**
4		
5	Brown-orange, medium SILTY SAND with some gravel and few cobbles; moist.	**SILTY SAND**
6	Light brown, fine SAND with some silt, little gravel, few cobbles; moist.	
7		
8	- with some gravel and few boulders.	**GLACIAL TILL**
9		
10		
11	- with common cobbles.	
12		**Refusal at 11 ft.**

NOTES:

Test pit was excavated with John Deere 410G and toothed bucket.

Minor caving observed below 4 ft.

Refusal on bedrock or large boulder at 11 ft.

TEST PIT NUMBER

TP-1

planning, permitting, design, construction, operation, maintenance Weston&Sampson®

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TEST PIT LOG

PROJECT NAME/NO.	Grafton DPW - 2140353.C			**TEST PIT NUMBER**	
LOCATION	Old Westboro Road			TP-2	
CLIENT	Town of Grafton			GROUND SURFACE	
CONTRACTOR	Town of Grafton	FOREMAN:	Damion/Joe	ELEVATION	El. 502 +/-
OBSERVED BY	Julie A. Eaton	DATE	11/20/14	DEPTH TO GROUNDWATER	
CHECKED BY	Chris Palmer, PE	DATE	12/1/14		Not encountered.

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Grass with exposed bedrock or boulders in the area.	
1	Gray-brown, gravelly, fine to medium SAND FILL with some silt, few angular cobbles and boulders (up to 18 in. diameter), and trace organics (roots); moist.	**TOPSOIL (3 in.)**
2	- with common cobbles and without trace organics at approximately 24 in.	**SAND FILL**
3	Brown-orange, fine SAND with some silt, few cobbles, and trace gravel; moist.	**SILTY SAND**
4		
5	Light brown, fine SAND with little gravel and silt, and few cobbles; moist.	**GLACIAL TILL**
6		**Refusal at 5 ft.**
7		
8		
9		
10		
11		
12		

NOTES:
Test pit excavated with John Deere 410G and toothed bucket.
Refusal on bedrock or very large boulder at 5 ft.
TP length was increased, refusal became shallower to the east.
Exposed bedrock visible to the east of the excavation.
Minor caving observed below 4 ft.

TEST PIT NUMBER
TP-2

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TEST PIT LOG

PROJECT NAME/NO.	Grafton DPW - 2140353.C			**TEST PIT NUMBER**	
LOCATION	Old Westboro Road			TP-3	
CLIENT	Town of Grafton			GROUND SURFACE	
CONTRACTOR	Town of Grafton	FOREMAN:	Damion/Joe	ELEVATION	El. 505 +/-
OBSERVED BY	Julie A. Eaton	DATE	11/20/14	DEPTH TO GROUNDWATER	
CHECKED BY	Chris Palmer, PE	DATE	12/1/14		Not encountered.

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Grass, forest debris (leaves), small brush, and common boulders.	
	Dark brown, SILTY SAND FILL with little organics (roots); moist.	**TOPSOIL (3 in.)**
1	Gray-brown, medium to coarse SAND FILL with numerous boulders (up to 28 in. diameter), common cobbles, some silt, little gravel, trace organics (roots) and occasional debris (trash, aluminum can); moist.	**SAND FILL WITH BOULDERS**
2	- Numerous cobbles and boulders (up to 36 in. diameter) with voids. One boulder has ~2-in. diameter hole (man-made) through it.	
3	Brown-orange, fine SILTY SAND with little gravel, few cobbles, and trace organics (roots); moist.	**SILTY SAND**
4	- without organics (roots) at approximately 3.5 ft.	
	- with common cobbles at 4 ft.	
5	Gray WEATHERED ROCK with coarse sand and trace silt encountered at 4.5 ft.	**WEATHERED ROCK**
6		**Refusal at 5 ft.**
7		
8		
9		
10		
11		
12		

NOTES:

Test pit was excavated with John Deere 410G and toothed bucket.

Minor caving observed below 1 ft.

Test pit location approximately 5 ft. from tree line.

Refusal on bedrock or large boulders at 5 ft.

TEST PIT NUMBER

TP-3

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TEST PIT LOG

PROJECT NAME/NO.	Grafton DPW - 2140353.C			**TEST PIT NUMBER**	
LOCATION	Old Westboro Road			TP-4	
CLIENT	Town of Grafton			GROUND SURFACE	
CONTRACTOR	Town of Grafton	FOREMAN:	Damion/Joe	ELEVATION	El. 499 +/-
OBSERVED BY	Julie A. Eaton	DATE	11/20/14	DEPTH TO GROUNDWATER	
CHECKED BY	Chris Palmer, PE	DATE	12/1/14		Not encountered.

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Wooded area, small brush, boulders.	
	Dark brown, SILTY SAND FILL with little organics (roots); moist.	**TOPSOIL (3 in.)**
1	Gray-brown, medium to coarse SAND FILL, numerous cobbles and boulders (up to 40 in. diameter), some gravel, little silt, and trace organics (roots); moist. Voids present between cobbles and boulders.	**SAND FILL WITH COBBLES AND BOULDERS**
2		
3		
4	Brown-orange, fine SILTY SAND with few cobbles and boulders, trace gravel and organics (roots up to 2 in. diameter); moist.	**SILTY SAND**
5	- Boulders between 36 in. and 48 in. diameter present.	
6	- without organics (roots) at approximately 5 ft.	
7	Light brown, fine SAND with little silt and gravel, and few cobbles; moist.	**GLACIAL TILL**
8	- with few boulders.	
9		
10		
11		**Bottom of Excavation at 10.5 ft.**
12		

NOTES:

Test pit was excavated with John Deere 410G and toothed bucket.

Moderate caving observed below 1 ft.

TEST PIT NUMBER

TP-4

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TEST PIT LOG

PROJECT NAME/NO.	Grafton DPW - 2140353.C			**TEST PIT NUMBER**	
LOCATION	Old Westboro Road			TP-5	
CLIENT	Town of Grafton			GROUND SURFACE	
CONTRACTOR	Town of Grafton	FOREMAN:	Damion/Joe	ELEVATION	El. 506 +/-
OBSERVED BY	Julie A. Eaton	DATE	11/20/14	DEPTH TO GROUNDWATER	
CHECKED BY	Chris Palmer, PE	DATE	12/1/14		Not encountered.

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Small brush and grass.	
	Dark brown, SILTY SAND FILL with little organics (roots); moist.	**TOPSOIL (3 in.)**
1	Gray-brown, fine to medium SAND FILL with some silt and gravel, and trace organics (roots); moist.	**SAND FILL**
2		
3	Brown-orange, fine to medium SAND with some gravel and silt, few cobbles and boulders (up to 24 in. diameter), and trace organics (roots up to 2 in. diameter); moist.	**SILTY SAND**
4	Brown, fine SAND with little gravel and silt, few cobbles, and trace organics (roots); moist.	
5	- without organics (roots) at 5 ft.	
6	Light brown, gravelly, fine to coarse SAND with LITTLE silt and few cobbles; moist.	**GLACIAL TILL**
7		
8	- with few boulders at 7.5 ft.	
9		
10		**Refusal at 9 ft.**
11		
12		

NOTES:

Test pit was excavated with John Deere 410G and toothed bucket.

Minor caving observed below 4 ft.

Refusal on bedrock or large boulder at 9 ft.

TEST PIT NUMBER

TP-5

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TEST PIT LOG

PROJECT NAME/NO.	Grafton DPW - 2140353.C			**TEST PIT NUMBER**	
LOCATION	Old Westboro Road			TP-6	
CLIENT	Town of Grafton			GROUND SURFACE	
CONTRACTOR	Town of Grafton	FOREMAN:	Damion/Joe	ELEVATION	El. 513 +/-
OBSERVED BY	Julie A. Eaton	DATE	11/20/14	DEPTH TO GROUNDWATER	
CHECKED BY	Chris Palmer, PE	DATE	12/1/14		Not encountered.

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Small brush and grass; tree line approximately 10 ft. from test pit.	
	Dark brown, SILTY SAND FILL with little organics (roots); moist.	**TOPSOIL (2 in.)**
1	Gray-brown, gravelly, fine to medium SAND FILL with little silt, few cobbles and very few boulders, and trace organics (roots up to 3 in. diameter); moist.	**SAND FILL**
2		
3	Brown-orange, SILTY SAND with some gravel, trace organics (roots), and few cobbles; moist.	**SILTY SAND**
4		
	- without organics (roots) at approximately 4 ft.	
5	Light brown, medium to coarse SAND with some gravel, few cobbles and little silt; moist.	
6		**GLACIAL TILL**
7		
8	- with few boulders at 7.5 ft.	
9		
10		**Refusal at 9 ft.**
11		
12		

NOTES:

Test pit was excavated with John Deere 410G and toothed bucket.

Minor caving observed below 4 ft.

Refusal on bedrock or large boulder at 9 ft. bgs

TEST PIT NUMBER

TP-6

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TEST PIT LOG

PROJECT NAME/NO.	Grafton DPW - 2140353.C			**TEST PIT NUMBER**	
LOCATION	Old Westboro Road			TP-7	
CLIENT	Town of Grafton			GROUND SURFACE	
CONTRACTOR	Town of Grafton	FOREMAN:	Damion/Joe	ELEVATION	El. 507 +/-
OBSERVED BY	Julie A. Eaton	DATE	11/20/14	DEPTH TO GROUNDWATER	
CHECKED BY	Chris Palmer, PE	DATE	12/1/14		Not encountered.

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Tall grass.	
1	Dark brown, SILTY SAND FILL with some gravel, trace debris (plastic, metal, wood) and organics (roots), and few cobbles; moist.	**TOPSOIL/SAND FILL**
2		
3	Brown fine SAND with some silt, little gravel, trace organics (roots), and few cobbles; moist.	**SILTY SAND**
4		
5	Light brown, medium to coarse SAND with some gravel, few cobbles, and little silt; moist.	
6		
7		**GLACIAL TILL**
8	- with few boulders at 7.5 ft.	
9		
10		**Refusal at 9.5 ft.**
11		
12		

NOTES:

Test pit was excavated with John Deere 410G and toothed bucket.

Minor caving observed below 4 ft.

Refusal on bedrock or large boulder at 9.5 ft.

TEST PIT NUMBER

TP-7

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TEST PIT LOG

PROJECT NAME/NO.	Grafton DPW - 2140353.C			**TEST PIT NUMBER**	
LOCATION	Old Westboro Road			TP-8	
CLIENT	Town of Grafton			GROUND SURFACE	
CONTRACTOR	Town of Grafton	FOREMAN:	Damion/Joe	ELEVATION	El. 505 +/-
OBSERVED BY	Julie A. Eaton	DATE	11/20/14	DEPTH TO GROUNDWATER	
CHECKED BY	Chris Palmer, PE	DATE	12/1/14		Not encountered.

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Grass and brush.	
	Dark brown, silty SAND FILL with little organics (roots); moist.	**TOPSOIL (2 in.)**
1	Gray-brown, gravelly SAND FILL with little silt, common cobbles, few boulders, and trace organics (roots); moist.	
2	- with common boulders (18 in. - 30 in. diameter) at 1.5 ft.	**SAND FILL**
3	- with few boulders.	
4	Brown, fine SAND with some silt, little gravel, very few cobbles, and trace organics (roots); moist.	**SILTY SAND**
5	- without organics (roots) at approximately 4 ft. - with few boulders at 4.5 ft.	
6	Light brown, gravelly, fine to medium SAND with little silt, few boulders and cobbles; moist.	
7		
8		**GLACIAL TILL**
9		
10		
11		
12		**Bottom of Excavation at 11 ft.**

NOTES: Test pit was excavated with John Deere 410G and toothed bucket.
Minor caving observed below 4 ft.

TEST PIT NUMBER
TP-8

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TEST PIT LOG

PROJECT NAME/NO.	Grafton DPW - 2140353.C			**TEST PIT NUMBER**	
LOCATION	Old Westboro Road			TP-9	
CLIENT	Town of Grafton			GROUND SURFACE	
CONTRACTOR	Town of Grafton	FOREMAN:	Damion/Joe	ELEVATION	El. 513 +/-
OBSERVED BY	Julie A. Eaton	DATE	11/20/14	DEPTH TO GROUNDWATER	
CHECKED BY	Chris Palmer, PE	DATE	12/1/14		Not encountered.

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Brush -- STOCKPILE	
	Dark brown, SILTY SAND FILL with little organics (roots); moist.	**TOPSOIL (2 in.)**
1	Dark brown, fine to medium SAND FILL with some rounded and subrounded gravel, little silt, trace organics (roots) and debris (plastic); moist.	
2	-without organics (roots) at approximately 0.5 ft.	
3		
4		
5		**SAND FILL**
6		
7		
8		
9	Layer of grass and topsoil encountered at 8.75 ft.	
10		**End of Excavation at 9 ft.**
11		
12		

NOTES:

Test pit was excavated with John Deere 410G and toothed bucket.

Minor caving observed below 3 ft.

End of excavation depth at approximate bottom of stockpile.

TEST PIT NUMBER

TP-9

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-10	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	501 ±
OBSERVED BY	TJ Blair, PE	DATE	May 6, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
0	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**10" ORGANIC SILT [TOPSOIL]**
1	Medium dense, grey, fine to coarse sandy SILT, little gravel, occasional cobbles and boulders; moist. [FILL]	**SANDY SILT [FILL]**
2		
3		
4	Medium stiff, dark brown SILT, some organics; moist. [BURIED TOPSOIL] *Moisture Content = 30%, Organic Content = 6%*	**SILT [BURIED TOPSOIL]**
5	Medium stiff, orange-brown SILT, some organics (roots), little to some fine sand, occasional boulders; moist. *Approximately 3-ft. diameter boulder removed this layer.*	**SILT**
6	Dense, grey, silty fine to coarse SAND, some gravel; moist. [GLACIAL TILL].	**SILTY SAND [GLACIAL TILL]**
7		
8		
9	***Refusal on bedrock or large boulder at approximately 8.0 ft.***	
10		
11		
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.
2 - Minor to moderate caving observed below approximately 5 ft.
3 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.
4 - Groundwater seepage was not observed.
5 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-10

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-11	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	508 ±
OBSERVED BY	TJ Blair, PE	DATE	May 6, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
1	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**12" ORGANIC SILT [TOPSOIL]**
2	Medium dense, grey, fine to coarse sandy SILT, some gravel, frequent cobbles, occasional boulders; moist. [FILL]	**SANDY SILT [FILL]**
	Medium stiff, dark brown SILT, some organics; moist. [BURIED TOPSOIL]	**SILT [BURIED TOPSOIL]**
3	Medium stiff, orange-brown SILT, trace organics (roots), trace fine sand; moist.	
4		**SILT**
5		
6	Medium dense, grey with orange-brown seams, silty fine to medium SAND, trace gravel; moist. [GLACIAL TILL]	**SILTY SAND [GLACIAL TILL]**
7	***Refusal on bedrock or large boulder at approximately 6.0 ft.***	
8		
9		
10		
11		
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.
2 - Minor to moderate caving observed below approximately 4 ft.
3 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.
4 - Groundwater seepage was not observed.
5 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-11

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-12	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	515 ±
OBSERVED BY	TJ Blair, PE	DATE	May 6, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
	Grey GRAVEL, trace fine to coarse sand, trace silt; moist. [FILL]	**GRAVEL [FILL]**
1	Dense, gray, fine to coarse SAND, some gravel, some silt, frequent cobbles, frequent boulders up to 18" diameter; moist. [GLACIAL TILL]	**SAND [GLACIAL TILL]**
2		
3	***Refusal on bedrock or large boulder at approximately 2.0 ft.***	
4		
5		
6		
7		
8		
9		
10		
11		
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.

2 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.

3 - Groundwater seepage was not observed.

4 - Test pit completed in vehicle turnaround area surfaced with gravel.

TEST PIT NUMBER
TP-12

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-13	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	504 ±
OBSERVED BY	TJ Blair, PE	DATE	May 6, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
1	Dark brown (grades to grey), sandy fine to coarse SILT, some gravel, trace to little organics; moist. [FILL] *Woven geotextile observed at approximately 1.0' in north sidewall.*	**SANDY SILT [FILL]**
2		
3	Medium stiff, dark brown SILT, some organics; moist. [BURIED TOPSOIL]	**SILT [BURIED TOPSOIL]**
	Medium stiff, orange-brown SILT, trace organics (roots), little to some fine sand, occasional boulders; moist.	**SILT**
4	***Refusal on bedrock or large boulder at approximately 3.0 ft.***	
5		
6		
7		
8		
9		
10		
11		
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.

2 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.

3 - Groundwater seepage was not observed.

4 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-13

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-14	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	503 ±
OBSERVED BY	TJ Blair, PE	DATE	May 6, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
1	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**12" ORGANIC SILT [TOPSOIL]**
2	Medium dense, grey, fine to coarse sandy SILT, some gravel, frequent cobbles, occasional boulders; moist. [FILL]	**SANDY SILT [FILL]**
3		
4	Medium stiff, dark brown SILT, some organics; moist. [BURIED TOPSOIL]	**SILT [BURIED TOPSOIL]**
5	Medium stiff, orange-brown SILT, trace gravel, trace fine sand, trace organics (roots); moist.	**SILT**
6	Grey, silty fine to coarse SAND, some gravel; moist. [GLACIAL TILL]	**SILTY SAND [GLACIAL TILL]**
7	***Refusal on bedrock or large boulder at approximately 6.0 ft.***	
8		
9		
10		
11		
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.
2 - Minor to moderate caving observed below approximately 4 ft.
3 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.
4 - Groundwater seepage was not observed.
5 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-14

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-15	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	509 ±
OBSERVED BY	TJ Blair, PE	DATE	May 6, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
0	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**10" ORGANIC SILT [TOPSOIL]**
1	Medium stiff, grey, fine to coarse sandy SILT, some gravel, occasional cobbles and boulders; moist. [FILL]	**SANDY SILT [FILL]**
6	Dark brown SILT, some organics; moist. [BURIED TOPSOIL]	**6" SILT [BURIED TOPSOIL]**
7	Orange-brown SILT, little fine sand, trace gravel; moist.	**SILT**
8	Grey, fine to coarse SAND, some gravel, some silt, occasional cobbles and boulders; moist. [GLACIAL TILL]	**SAND [GLACIAL TILL]**
12	***Test pit ended at approxiamtely 11.5 ft. due to caving and excavator reach cabability.***	

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.
2 - Severe caving observed below approximately 5 ft.
3 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.
4 - Groundwater seepage was not observed.
5 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-15

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-16	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	488 ±
OBSERVED BY	TJ Blair, PE	DATE	May 6, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
1	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**12" ORGANIC SILT [TOPSOIL]**
2	Medium stiff, orange-brown SILT, little fine sand, trace gravel, trace organics (roots), frequent cobbles and boulders; moist.	**SILT**
3	Dense, grey, silty fine to coarse SAND, some gravel; moist. [GLACIAL TILL].	**SILTY SAND [GLACIAL TILL]**
4		
5		
6	Bedrock or large boulder, moderately fractured / weathered.	**BEDROCK OR LARGE BOULDER**
7	***Refusal on bedrock or large boulder at approximately 6.0 ft.***	
8		
9		
10		
11		
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.
2 - Minor to moderate caving observed below approximately 4 ft.
3 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.
4 - Groundwater seepage was not observed.
5 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-16

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-17	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	496 ±
OBSERVED BY	TJ Blair, PE	DATE	May 6, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**8" ORGANIC SILT [TOPSOIL]**
1	COBBLES. [FILL]	**COBBLES [FILL]**
2		
	Medium stiff, dark brown SILT, some organics; moist.	**SILT [BURIED TOPSOIL]**
3	Medium stiff, orange-brown SILT, trace gravel, trace fine sand, trace organics (roots); moist.	**SILT**
4		
5	Grey, silty fine to coarse SAND, some gravel, occasional cobbles; moist. [GLACIAL TILL]	**SILTY SAND [GLACIAL TILL]**
6		
7		
	Test pit ended at 7.0 ft.	
8		
9		
10		
11		
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.
2 - Minor to moderate caving observed below approximately 5 ft.
3 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.
4 - Groundwater seepage was not observed.
5 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-17

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-18	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	498 ±
OBSERVED BY	TJ Blair, PE	DATE	May 6, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
0	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**10" ORGANIC SILT [TOPSOIL]**
1	Medium stiff, grey, fine to coarse sandy SILT, some gravel, trace roots, occasional cobbles; moist. [FILL]	**SANDY SILT [FILL]**
2	Medium stiff, orange-brown SILT, trace to little fine sand, trace roots; moist.	**SILT**
3	Dense, grey, fine to coarse SAND, some gravel, little silt; moist. [GLACIAL TILL]	**SAND [GLACIAL TILL]**
4		
5		
6	***Refusal on bedrock or large boulder at approximately 5.0 ft.***	
7		
8		
9		
10		
11		
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.

2 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.

3 - Groundwater seepage was not observed.

4 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-18

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-19	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	499 ±
OBSERVED BY	TJ Blair, PE	DATE	May 5, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
1	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**12" ORGANIC SILT [TOPSOIL]**
2	Medium stiff, fine to coarse sandy SILT, some gravel, frequent boulders; moist. [FILL]	**SANDY SILT [FILL]**
3		
4		
5	Medium stiff, dark brown SILT, some organics; moist. [BURIED TOPSOIL]	**SILT [BURIED TOPSOIL]**
6	Orange-brown SILT, trace to little fine sand, trace organics; moist.	**SILT**
7	Brown, fine sandy SILT; moist.	
8	***Refusal on bedrock or large boulder at approximately 7.0 ft.***	
9		
10		
11		
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.
2 - Minor to moderate caving observed below approximately 5 ft.
3 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.
4 - Groundwater seepage was not observed.
5 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-19

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-20	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	488 ±
OBSERVED BY	TJ Blair, PE	DATE	May 5, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
0	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**10" ORGANIC SILT [TOPSOIL]**
1	Medium stiff, orange-brown SILT, little fine sand, trace gravel, trace organics (roots); moist.	**SILT**
4	Dense, gray, fine to coarse SAND, some gravel, little silt; moist. [GLACIAL TILL]	**SAND [GLACIAL TILL]**
6	***Refusal on bedrock or large boulder at approximately 6.0 ft.***	
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.
2 - Minor to moderate caving observed below approximately 4 ft.
3 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.
4 - Groundwater seepage was not observed.
5 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-20

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-21	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	483 ±
OBSERVED BY	TJ Blair, PE	DATE	May 5, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**10" ORGANIC SILT [TOPSOIL]**
1	Medium stiff, orange-brown, fine sandy SILT, trace organics (roots); moist.	**SILT**
2		
3		
4	Dense, gray, silty fine to coarse SAND, some gravel; moist. [GLACIAL TILL]	**SILTY SAND [GLACIAL TILL]**
5	Bedrock or large boulder, moderately fractured / weathered.	**BEDROCK OR LARGE BOULDER**
6	***Refusal on bedrock or large boulder at approximately 5.5 ft.***	
7		
8		
9		
10		
11		
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.
2 - Minor to moderate caving observed below approximately 4 ft.
3 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.
4 - Groundwater seepage was not observed.
5 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-21

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TEST PIT LOG

PROJECT	New Department of Public Works (DPW) Facility - 2180199			**TEST PIT NUMBER**	
LOCATION	Grafton, Massachusetts			TP-22	
CLIENT	Town of Grafton, Massachusetts			GROUND SURFACE	
COMPLETED BY	Town of Grafton, Massachusetts			ELEVATION (ft.)	504 ±
OBSERVED BY	TJ Blair, PE	DATE	May 5, 2018	DEPTH TO	
CHECKED BY	Chris Palmer, PE	DATE	June 7, 2018	GROUNDWATER	N/A

DEPTH BELOW GROUND SURFACE (ft.)	MATERIAL DESCRIPTION	STRATUM DESCRIPTION
1	Dark brown ORGANIC SILT, little sand, frequent roots; moist. [TOPSOIL]	**12" ORGANIC SILT [TOPSOIL]**
2	Medium stiff, gray, fine to medium sandy SILT with trace gravel and several isolated pockets of orange-brown, fine sandy SILT and soft, dark brown ORGANIC SILT and PEAT (strong organic odor); moist. [FILL]	**SILT AND ORGANICS [FILL]**
3		
4		
5		
6		
7		
8		
9		
10		
11	***Test pit ended at approximately 10.0 ft. due to caving and excavator reach capability.***	
12		

GENERAL NOTES:

1 - Test pit excavated using an approximately 18,000-lb. excvavator (CAT 312C) with a toothed bucket.
2 - Severe caving observed below approximately 6 ft.
3 - Densities/consistencies, where noted, were esimated based on probing the sidewall with a 1/2" diameter steel soil probe.
4 - Groundwater seepage was not observed.
5 - Samples of each soil stratum collected for storage and/or laboratory testing.

TEST PIT NUMBER
TP-22

Weston & Sampson

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Appendix E

Site Lighting Brochures

LUMARK

TYPE S1 AND S3

Full Cutoff

Flat Solite® Glass

Borosilicate Glass / Polycarbonate Refractor

SustainabLEDesign™

Wal-Pak

Wall Mount Luminaire

COOPER Lighting

WP WAL-PAK WALL SERIES

WALL MOUNT LUMINAIRE

THE NEW STANDARD

The Wal-Pak Series of wall luminaires offers traditional architectural styling, rugged construction and superior performance. Coupled with available Light Emitting Diode [LED] technology, full cutoff removable door, standard IP65 Ingress Protection and emergency egress options, Wal-Pak is an exceptionally flexible platform that offers undisputed appeal for wall mount applications.

ENERGY SAVINGS

Conservation of energy, expertise in design and rigourous reliability testing ensure superior luminaire performance. With advancements in LED technology combined with Cooper Lighting's expertise in fixture and optical design, the Wal-Pak Series demonstrates that new technology saves energy without compromising performance.

FULL CUTOFF DOOR
[FC]

FLAT SOLITE® GLASS DOOR
[FL]

BOROSILICATE GLASS/
POLYCARBONATE REFRACTOR DOOR
[GL/PL]

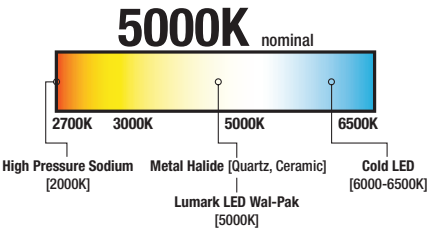
ABUNDANT SELECTION

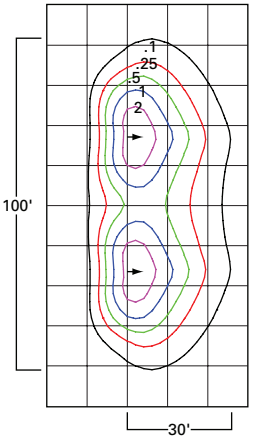
The Wal-Pak Series provides a choice of three [3] hinged, removable doors including IESNA full cutoff, Solite™ flat glass lens and refractive, tempered borosilicate glass along with six [6] unique lamp sources inclding energy efficient LED, pulse start metal halide, compact fluorescent, ceramic metal halide, standard metal halide and high pressure sodium.

LED SPECIFICATION FEATURES

UNIFORM ILLUMINATION

Wal-Pak's patent pending LED light engine is optimized for energy efficient performance. With effective thermal management, precise positioning of the LED package assembly and a highly reflective anodized aluminum reflector; Wal-Pak LED provides glare free, uniform illumination while providing a safe and comfortable visual experience.





LED TECHNOLOGY

Light emitting diodes are solid state devices that offer uniform illumination, reliable long life, eco-friendly low maintenance, and superior energy savings. Over 70% of the initial light output is maintained after 50,000 hours of operation. In application, an LED fixture can last up to six [6] times longer than metal halide lamped sources.

SUPERIOR ILLUMINATION

Wal-Pak LED luminaires produce up to 4000 initial lumens. Brilliant white 5000K color temperature LED's provide uniform white light similar to traditional metal halide light sources. Combining excellent color rendering with superior thermal management, optimized reflector technology and premium glare-free Solite™ glass make the Wal-Pak LED luminaire a superior performer.

LED WAL-PAK FULL CUTOFF 4A MODEL TYPICAL APPLICATION:

- 100' Illumination Distribution Pattern [2 fixtures]
- 30' Forward Throw
- 75% Street Side Illumination
- IESNA Full Cutoff Compliant
- Replaces up to 175W Metal Halide

REDUCED ENERGY CONSUMPTION

Operating and maintenance costs of a lighting system are dramatically impacted by the specified lamp source and electrical system. Total system input watts and fixture operating life should be the driving considerations when addressing energy consumption and total cost of ownership. Energy savings increase when energy consumption is reduced and maintenance intervals are extended.

ANNUALIZED ENERGY SAVINGS/COST COMPARISON

FIXTURE	HOURS/ YEAR	LIFE [hrs.]	TOTAL INPUT WATTS	COST/YEAR @ $ .10 KWH	RELAMP/FIXTURE	TOTAL ANNUALIZED COST/FIXTURE	SAVINGS PER FIXTURE	OVERALL % SAVINGS
LED Wal-Pak [2400 Lumens]	11/4015	50,000	22	$8.83	$0	$8.83	$92.96	**91%**
100W MP Wall Pack		12,000	128	$51.79	$50	$101.79		
LED Wal-Pak [4000 Lumens]	11/4015	50,000	40	$16.06	$0	$16.06	$138.26	**90%**
175W MH Wall Pack		12,000	210	$84.32	$70	$154.32		

NOTES: Cost = (Watts x 11 Hours Per Day x 365 Days per Year) /1000 = Daily Kilowatt hour (kWh). kWh x $.10 cents/kWh = Cost/year at $.10 cents/kWh. Relamp is once per every 2.5 years, $125/100W and $175/175W averaged over 2.5 years.

HID/LED CROSS REFERENCE CHART

HID SYSTEMS	HID WATTAGE	RATED AVG. LIFE [hrs.]	WAL-PAK LED SYSTEM LUMEN PACKAGE [1]	LED WATTAGE [2]	LED LIFE [hrs.]	ENERGY SAVINGS
50W Pulse Start Metal Halide	72	12,000	2A	22	50,000	**69%**
70W Pulse Start Metal Halide	90	12,000	2A	22	50,000	**76%**
100W Pulse Start Metal Halide	128	12,000	2A	22	50,000	**83%**
150W Pulse Start Metal Halide	189	12,000	4A	40	50,000	**79%**
175W Probe Start Metal Halide	210	12,000	4A	40	50,000	**81%**
50W High Pressure Sodium	66	24,000	2A	22	50,000	**67%**
70W High Pressure Sodium	91	24,000	2A	22	50,000	**76%**
100W High Pressure Sodium	130	24,000	4A	40	50,000	**69%**
150W High Pressure Sodium	188	24,000	4A	40	50,000	**79%**

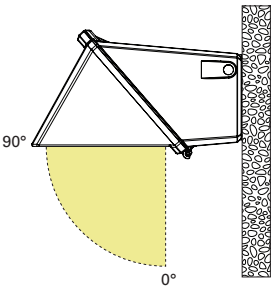
NOTES: **1** Nominal lumens prior to optical and configuration losses based on 67 CRI. 5000K package at 25ºC ambient. 2A=2400 [Lumens], 4A=4000 [Lumens]. **2** LED Wattage varies by Wal-Pak configuration. Hours of life based on 70% lumen maintenance.

DARK SKY FRIENDLY + OPTIONS + ACCESSORIES

DARK SKY FRIENDLY ILLUMINATION

The Wal-Pak Series with full cutoff door meets The Illuminating Engineering Society of North American [IESNA] classification for full cutoff illumination [zero light at or above the 90° plane]. Full cutoff luminaires minimize light trespass and light pollution.

DARK SKY COMPLIANT FCO Full Cutoff



BACK-UP POWER OPTIONS

Wal-Pak solves the requirement for providing back-up power illumination along the path of egress during critical power outage situations. Select from LED or compact fluorescent integral NiCad battery packs, quartz restrike, low or line voltage DC remote or separate circuit emergency back-up options.

SINGLE OR DUAL LAMP COMPACT FLUORESCENT EMERGENCY BATTERY PACK OPTIONS

[CF-EM, EMI40, CF-EM-2L, EMI40-2L]

Integral UL924 emergency lighting NiCad battery pack provides emergency lighting illumination for single or dual lamp compact fluorescent light sources. The CF-EM battery pack is designed for 0°C/32°F illumination for up to 70W. The EMI40 provides up to 70W of cold temperature -18°C/-4°F emergency back-up illumination. For two [2] 32W lamp operation use CF-EM-2L or EMI40-2L.

LED BATTERY PACK OPTIONS [EM-LED, EM-LED-CD]

Integral NiCad battery pack provides battery back-up illumination for 4A models. The LED-EM battery pack is designed for 0°C/32°F applications. EM-LED-CD is designed for -18°C/-4°F cold temperature applications.

EMERGENCY LOW VOLTAGE 12V DC REMOTE OPTIONS [EM/SC/12V, 2EM/SC/12V]

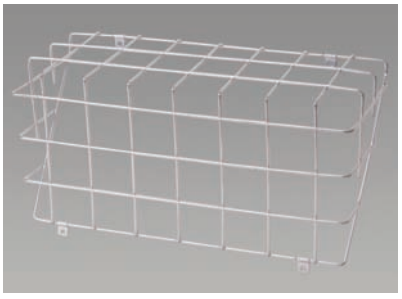
Single or dual lamp low voltage 12V DC bi-pin remote lamp provides fixture illumination in the emergency mode. The 12V DC lamps are energized from a remote DC battery source [provided by others].

SEPARATE CIRCUIT QUARTZ RESTRIKE AND EMERGENCY QUARTZ RESTRIKE OPTION [2QMR/SC]

MR16 halogen lamp source illuminates upon the reactivation of the HID lamp. The secondary source provides separate circuit emergency illumination upon loss of utility power.

QUARTZ RESTRIKE OPTIONS [Q, QMR, 2QMR, EM, EM/SC]

T4 quartz restrike [120V] and sngle or dual MR16 halogen lamps allow adequate time for main HID lamp to reignite to full brilliance. EM option allows for cold start of HID lamps as it includes a time delay relay. The EM/SC emergency separate circuit option allows for the quartz lamps to be wired to an independent emergency back-up power source.



WIRE GUARD [WG/ITM]

Galvanized coated steel wire guard option prevents lens damage due to projected elements.

SPECIFICATION FEATURES

CONSTRUCTION AND RATINGS

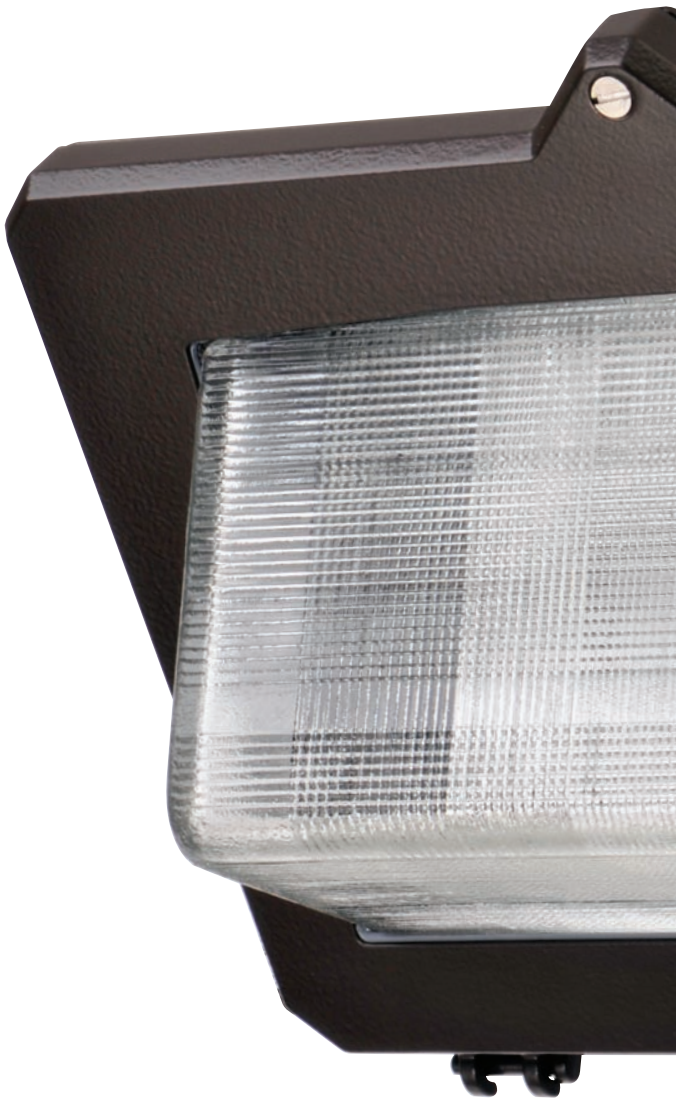
Rugged one-piece die-cast aluminum housing and hinged, removable die-cast aluminum door. One-piece silicone gasket seals the optical chamber against performance degrading contaminates. UL 1598 wet location listed and IP65 ingress protection provides complete defense against dust entry while virtually eliminating moisture. Single point, captive stainless steel hardware secures the removable hinged door allowing for ease of installation and maintenance.

OPTICAL

Custom engineered highly reflective anodized aluminum reflectors provide high efficiency illumination. Impact resistant tempered borosilicate refractive glass provides maximum photometric performance and beam efficiency. Solite™ flat diamond patterned glass ensures smooth illumination coupled with a clean aesthetic appearance. Patent pending solid state LED luminaires are thermally optimized with 2400 or 4000 lumen package modules. Tradition light source optical assemblies are offered standard with horizontal medium or mogul-based metal halide [MH / MP] or high pressure sodium [HP] lamps. High efficiency T6 ceramic metal halide [CM] offers excellent color rendering and energy efficient 4-pin compact fluorescent [CF] lamps provide excellent lumen maintenance.

ELECTRICAL

Ballasts, LED driver and related electrical components are safely secured and hard mounted to the die-cast housing for optimal heat sinking and operating efficiency. All wiring is extended through a silicone gasket at the back of the housing to prevent entry of debris, moisture, dust and insects. Three 1/2" threaded conduit entry points allow for thru-branch wiring. Patent pending Wal-Pak LED thermal management system incorporates both conductive and natural convection to transfer heat rapidly away from the LED source. Integral LED electronic driver incorporates internal fusing designed to withstand a 3kV line surge and is Class 2 rated for 120-277V with an operating temperature of -30°C to 60°C. Wal-Pak LED systems maintain greater than 70% of the initial light output after 50,000 hours of operation. UL listed HID high power factor ballasts are Class H insulation rated [metal halide: 150, 175, 200, 250, 320, 350, 400W [-30ºC /-20ºF], high pressure sodium: 50, 70, 100, 150, 250, 400W [-40ºC/-40ºF]. High efficiency HID ballasts are available in a multitude of voltage configurations including 120, 208, 240, 277, 347 and 480V. Compact fluorescent high power factor ballasts are Class P insulation rated for 120-277V and have a starting temperature of -18ºC/0ºF.



DARK SKY COMPLIANT FCO Full Cutoff

NOTE: In full cutoff door [FC] configuration only.

FLAT SOLITE® GLASS DOOR
[FL]

FULL CUTOFF DOOR
[FC]

BOROSILICATE GLASS/
POLYCARBONATE REFRACTOR DOOR
[GL/PL]

FINISH

Housing and door are protected with a 5-stage TGIC dark bronze polyester powder coat paint. Premium TGIC powder coat finishes withstand extreme climate changes while providing optimal color and gloss retention over the fixture's installed life. Optional premium colors include black, white and grey.

STANDARD COLOR

BZ
Bronze

OPTIONAL COLORS

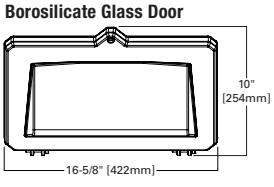
BK
Black

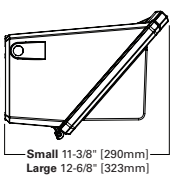
AP
Grey

WH
White

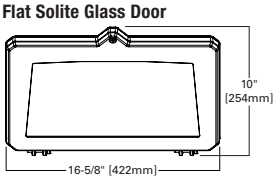
DIMENSIONS

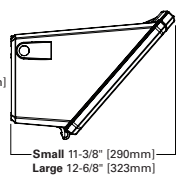
Borosilicate Glass Door



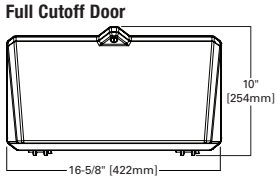


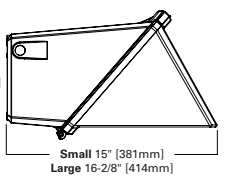
Flat Solite Glass Door





Full Cutoff Door





WATTAGE TABLE

Lamp Type	Lamp Wattage
Pulse Start Metal Halide	50, 70, 100, 150, 200, 250, 320, 350, 400W
Metal Halide	175, 250, 400W
High Pressure Sodium	50, 70, 100, 150, 250, 400W
T6 Ceramic Metal Halide	39, 70, 100, 150W
Compact Fluorescent	[1] 32, [1] 42, [1] 57, [1] 70, [2] 32, [2] 42, [2] 57, [2] 70W
LED	2400, 4000 [Lumens]

VOLTAGE CHART

DT=Dual-Tap	120/277V [wired 277V]
MT=Multi-Tap	120/208/240/277V [wired 277V]
TT=Tri-Tap	120/277/347V [wired 347V]
5T=5 Tap	120/208/240/277/480V [wired 480V]
E=Electronic Ballast	120-277V [Universal, 50/60Hz]
ED=Electronic LED Driver	120-277V [Universal, 50/60Hz]

CERTIFICATIONS

- 40°C Ambient Temperature Rating
- UL and cUL Listed
- IP65 Rated
- ISO 9001
- FCO [Full Cutoff]
- EISA, ARRA and Title 20 Compliant

SHIPPING DATA

Approximate Net Weight: 32-42 [15-19 kgs.]

WAL-PAK

ORDERING INFORMATION

SAMPLE NUMBER: LDWP-FC-4A-ED-EM-LED

LAMP TYPE
MP=Pulse Start Metal Halide
HP=High Pressure Sodium
LD=Solid State Light Emitting Diodes [LED]
CF=Compact Fluorescent [1]
CM=Ceramic Metal Halide [2]
MH=Metal Halide [3]

SERIES
WP=Wal-Pak

DOOR TYPE [4]
GL=Borosilicate Glass Door
FC=Full Cutoff Door
FL=Flat Solite Glass Door
PL=Polycarbonate Refractor Door

LAMP WATTAGE [5]

LED
2A=[2400 Initial Lumens]
4A=[4000 Initial Lumens]

MP
50=50W
70=70W
100=100W
150=150W
200=200W
250=250W
320=320W
350=350W
400=400W

HP
50=50W
70=70W
100=100W
150=150W
250=250W
400=400W

CF
32=32W
42=42W
57=57W
70=70W
64=[2] 32W
84=[2] 42W
114=[2] 57W
140=[2] 70W

CM
39=39W
70=70W
100=100W
150=150W

MH
175=175W
250=250W
400=400W

VOLTAGE [6]
120V=120V
277V=277V
347V=347V [7]
480V=480V
DT=Dual-Tap
MT=Multi-Tap
TT=Triple-Tap
5T=5-Tap
E=Electronic Ballast [8]
ED=Electronic LED Driver

OPTIONS + ACCESSORIES
[see below]

STOCK ORDERING INFORMATION

SAMPLE NUMBER: WPP40C

SERIES	LAMP TYPE	LAMP WATTAGE	DOOR/GLASS TYPE
WP=Wal-Pak	**P**=Pulse Start Metal Halide **S**=High Pressure Sodium	**10**=100W **15**=150W **25**=250W **32**=320W **40**=400W	__=Standard **C**=Full Cutoff Door

NOTES: 1 Options not available with stock products. Refer to standard ordering information to add options. MT is standard. MP not available in 100W. HPS not available in 320W. Borosilicate glass door standard.

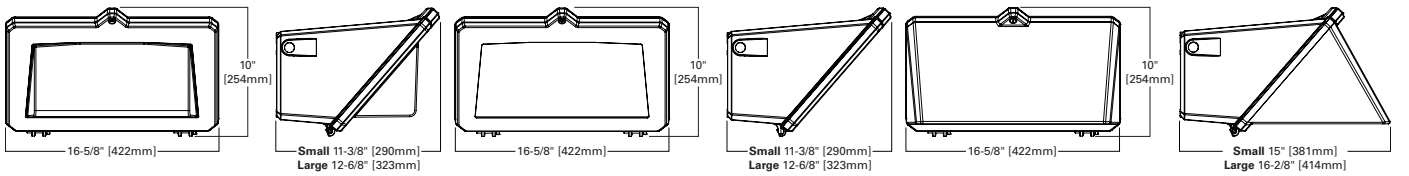
OPTIONS AND ACCESSORIES [Must be listed in the order shown and separated by a dash]

OPTIONS [add as suffix] [9]
F1=Single Fuse [10]
F2=Double Fuse [10]
PE=Photocontrol Button [10]
LL=Includes Lamp [2]
BK=Black
WH=White
AP=Grey
DIMA=CF Dimming Ballast [11]
DIMB=CF Dimming Ballast [11]
SGL=Solite Glass Lens [12]
Q=Quartz Restrike T4 Lamp [10, 13]
EM=Emergency Quartz Restrike T4 Lamp with Time Delay Relay [10, 13]
EM/SC=Emergency Separate Circuit T4 Lamp [10, 13, 16]
QMR=Emergency Back-Up [1] MR16 Lamp [14,15]
2QMR=Emergency Back-Up [2] MR16 Lamps [14,15]
2QMR/SC=Emergency Back-Up MR16 and EM Separate Circuit [2] MR16 Lamp [14,15]
EMMR=Emergency Back-Up [1] MR16 Lamp with Time Delay Relay [14,15]
2EMMR=Emergency Back-Up [2] MR16 Lamps with Time Delay Relay [14,15]
2EMMR/SC=Emergency Back-Up [1] MR16 Lamp with Time Delay Relay and EM Separate Circuit [14, 15, 16]
EM/SC/MR=Emergency Back-Up Separate Circuit [1] MR16 Lamp [14, 15, 16]
2EM/SC/MR=Emergency Back-Up Separate Circuit [2] MR16 Lamps [14, 15, 16]
EM/SC/12V=Emergency Separate Circuit 12V [1] MR16 Lamp [14, 16, 17]
2EM/SC/12V=Emergency Separate Circuit 12V [2] MR16 Lamps [14, 16, 17]
EMI40=Emergency Cold Temperature UL 924 CF Power Pack [1] Lamp [18]
EMI40/2L=Emergency Cold Temperature UL 924 CF Power Pack [2] Lamp [18]
CF-EM=Emergency UL924 CF Power Pack [1] Lamp [19]
CF-EM/2L=Emergency UL924 CF Power Pack [1] Lamp [19]
EM-LED=LED Battery Back-up [20]
EMLED-CD=LED Battery Back-Up Cold Temperature [20]

ACCESSORIES [order separately]
WG/WPGL=Wire Guard Borosilicate Glass Lens Door
WG/WPFC=Wire Guard Full Cutoff Door
WG/WPFL=Wire Guard Flat Glass Lens Door
TR/WP=Tamper Resistant Screw and Bit

DIMENSIONS

Borosilicate Glass Door | **Flat Solite Glass Door** | **Full Cutoff Door**



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LED	2400, 4000 [Lumens]

VOLTAGE CHART

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CERTIFICATIONS

40°C Ambient Temperature Rating
UL and cUL Listed
IP65 Rated
ISO 9001
FCO [Full Cutoff]
EISA, ARRA and Title 20 Compliant

SHIPPING DATA

Approximate Net Weight: 32-42 [15-19 kgs.]

NOTES: 1 CF Single lamp offered in all door configurations. CF dual lamp models not offered with FL door type. 70W models not available with EMI40-2L, CF-EM, CF-EM-2L. CF not available in 347V. **2** All CM models offered with T6 envelope G12 lamp base. T6 Lamp included with CM models. Order LL with CM models. Ceramic Metal Halide (CM) is available with (MP) pulse start metal halide or E - Electronic Ballast. **3** MH products available for non-US markets only. **4** Small housing offered for 175W and below, CF and LD models. Large housing for 200W-400W. FL door not available with CF or 200-400W models. Polycarbonate lens available in models up to 175W max including LD. Polycarbonate lens not available with full cutoff door or FL models. Solite stipple glass is standard for FL lens. Clear glass is standard for full cutoff door types except for LD. LD full cutoff door is standard with solite glass. **5** LD nominal initial lumens prior to optical and configuration losses based on 67 CRI/5000K package at 25°C ambient. MH and MP 175W and below are medium base all others are mogul base. CF 64, 84, 114 and 140 models are offered in borosilicate glass and full cutoff doors only. In cold temperatures, compact fluorescent lamps produce lower illumination levels. **6** See Voltage Chart for descriptions. 5T available in 400W MH models only. 90°C Rated wire required for thru-branch wiring for units 175W and lower. 105°C Rated wire required for thru-branch wiring for units 200W and higher. Thru-branch wiring is rated for 40°C for LD and 175W and below. Higher wattage thru-branch wiring is rated for use in 25°C ambient operating environments. **7** 347V not available with thru-branch wiring. For 347 or 480V LD specify voltage. ED will be supplied with integral step down transformer. 347V not available with CF lamps. **8** Available with 70-150W MP or CM lamps. E is standard for all CF models. All electronic ballasts are universal 120-277V. **9** Not all options can be combined. Only one emergency or battery back-up option available within the fixture. **10** Specify voltage. F1 - 120, 277 or 347V, F2 - 208 or 240V, PE - 120, 208, 240, 277V. Q, EM, EM/SC available in 120V only. **11** DIMA dimming ballast, specify number of lamps, available for 1 or 2-26W or 1-32W, 1-42W. DIMB available for 2-42W, 1-57W or 1-70W. **12** SGL optional on HID and CF models only. See note 4. **13** Max 100W, T4 Quartz lamp. Lamp supplied by others. **14** Not available with LD. Lamps supplied by others. **15** 1 or 2 GU10 base 50 watt max - 120V Halogen lamps supplied by others. **16** Emergency lamp leads out of the back of the unit to auxiliary power. Lamps independently wired to separate circuits. **17** Low Voltage 1 or 2 GU5.3 MR16 base, 12V DC, 35W max. Lamp supplied by others. **18** For use in 25°C ambient operating temperature environments. EMI40, EMI40/2L used for CF lamps. Specify 120 or 277V. EMI40 supports 1-70W CF max, EMI40/2L supports 2-32W CF max. Minimum -18°C/-4°F. **19** For use in 25°C ambient operating temperature environments. Specify 120 or 277V, CF-EM supports up to 1-57W CF. CF-EM/2L supports 2-18W CF, 18W lamps supplied by others. Minimum temperature is 0°F/32°C. **20** EM-LED and EMLED-CD available with 4A models only. For use in 25°C ambient operating temperature environments. Specify 120 or 277V EM-LED minimum 0°C/32°F, EMLED-CD minimum -20°C/-4°F. Battery pack is a UL recognized component. **21** Specifications and dimensions subject to change without notice.

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McGraw-Edison

DESCRIPTION

The Galleon™ LED luminaire delivers exceptional performance in a highly scalable, low-profile design. Patented, high-efficiency AccuLED Optics™ system provides uniform and energy conscious illumination to walkways, parking lots, roadways, building areas and security lighting applications. IP66 rated and UL/cUL Listed for wet locations.

Catalog #		**Type** TYPE S2 & S4
Project		
Comments		**Date**
Prepared by		

SPECIFICATION FEATURES

Construction
Extruded aluminum driver enclosure thermally isolated from Light Squares for optimal thermal performance. Heavy-wall, die-cast aluminum end caps enclose housing and die-cast aluminum heat sinks. A unique, patent pending interlocking housing and heat sink provides scalability with superior structural rigidity. 3G vibration tested and rated. Optional tool-less hardware available for ease of entry into electrical chamber. Housing is IP66 rated.

Optics
Patented, high-efficiency injection-molded AccuLED Optics technology. Optics are precisely designed to shape the distribution maximizing efficiency and application spacing. AccuLED Optics create consistent distributions with the scalability to meet customized application requirements. Offered standard in 4000K (+/- 275K) CCT 70 CRI. Optional 3000K, 5000K and 6000K CCT.

Electrical
LED drivers are mounted to removable tray assembly for ease of maintenance. 120-277V 50/60Hz, 347V 60Hz or 480V 60Hz operation. 480V is compatible for use with 480V Wye systems only. Standard with 0-10V dimming. Shipped standard with Eaton proprietary circuit module designed to withstand 10kV of transient line surge. The Galleon LED luminaire is suitable for operation in -40°C to 40°C ambient environments. For applications with ambient temperatures exceeding 40°C, specify the HA (High Ambient) option. Light Squares are IP66 rated. Greater than 90% lumen maintenance expected at 60,000 hours. Available in standard 1A drive current and optional 600mA, 800mA and 1200mA drive currents (nominal).

Mounting
STANDARD ARM MOUNT: Extruded aluminum arm includes internal bolt guides allowing for easy positioning of fixture during mounting. When mounting two or more luminaires at 90° and 120° apart, the EA extended arm may be required. Refer to the arm mounting requirement table. Round pole adapter included. For wall mounting, specify wall mount bracket option. QUICK MOUNT ARM: Adapter is bolted directly to the pole. Quick mount arm slide into place on the adapter and is secured via two screws, facilitating quick and easy installation. The versatile, patent pending, quick mount arm accommodates multiple drill patterns ranging from 1-1/2" to 4-7/8". Removal of the door on the quick mount arm enables wiring of the fixture without having to access the driver compartment. A knock-out enables round pole mounting.

Finish
Housing finished in super durable TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear. Heat sink is powder coated black. Standard housing colors include black, bronze, grey, white, dark platinum and graphite metallic. RAL and custom color matches available.

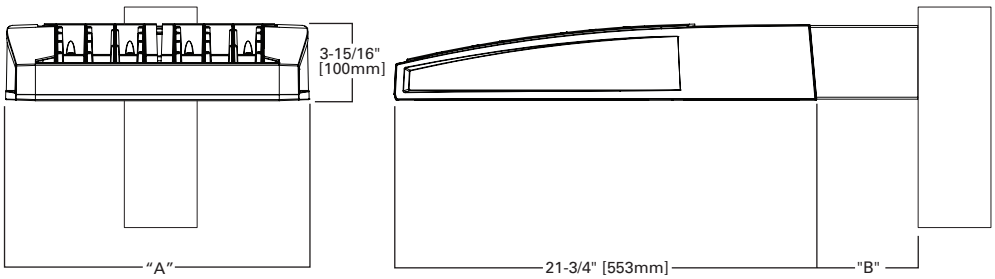
Warranty
Five-year warranty.

GLEON
GALLEON LED

1-10 Light Squares
Solid State LED

AREA/SITE LUMINAIRE

DIMENSIONS



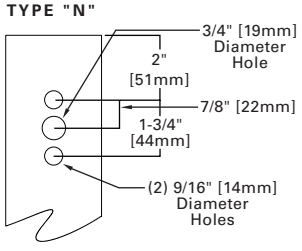
DIMENSION DATA

Number of Light Squares	"A" Width	"B" Standard Arm Length	"B" Optional Arm Length [1]	Weight with Arm (lbs.)	EPA with Arm [2] (Sq. Ft.)
1-4	15-1/2" (394mm)	7" (178mm)	10" (254mm)	33 (15.0 kgs.)	0.96
5-6	21-5/8" (549mm)	7" (178mm)	10" (254mm)	44 (20.0 kgs.)	1.00
7-8	27-5/8" (702mm)	7" (178mm)	13" (330mm)	54 (24.5 kgs.)	1.07
9-10	33-3/4" (857mm)	7" (178mm)	16" (406mm)	63 (28.6 kgs.)	1.12

NOTES: 1. Optional arm length to be used when mounting two fixtures at 90° on a single pole. **2.** EPA calculated with optional arm length.

DRILLING PATTERN

TYPE "N"



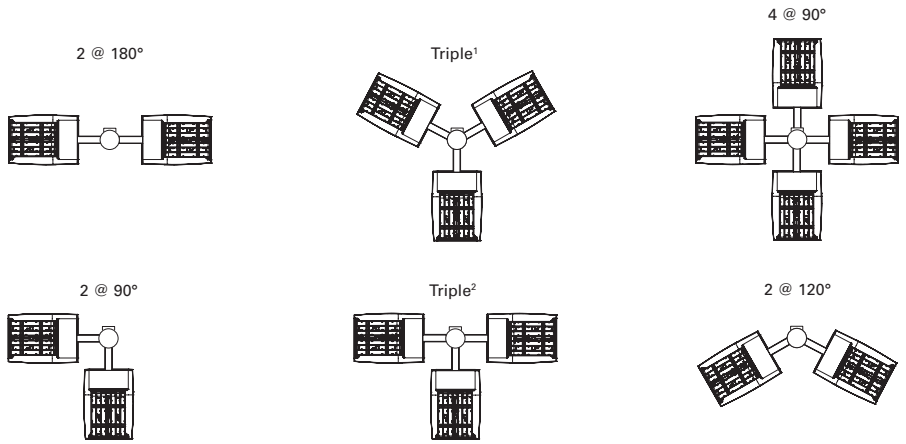
CERTIFICATION DATA
UL/cUL Wet Location Listed
ISO 9001
LM79 / LM80 Compliant
3G Vibration Rated
IP66 Rated
DesignLights Consortium™ Qualified*

ENERGY DATA
Electronic LED Driver
>0.9 Power Factor
<20% Total Harmonic Distortion
120V-277V 50/60Hz
347V & 480V 60Hz
-40°C Min. Temperature
40°C Max. Temperature
50°C Max. Temperature (HA Option)

*www.designlights.org

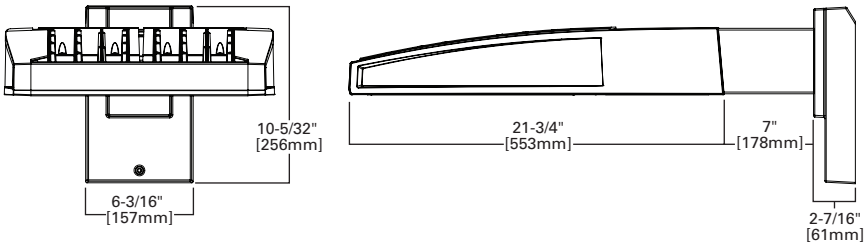
ARM MOUNTING REQUIREMENTS

Configuration	90° Apart	120° Apart
GLEON-AF-01	7" Arm (Standard)	7" Arm (Standard)
GLEON-AF-02	7" Arm (Standard)	7" Arm (Standard)
GLEON-AF-03	7" Arm (Standard)	7" Arm (Standard)
GLEON-AF-04	7" Arm (Standard)	7" Arm (Standard)
GLEON-AF-05	10" Extended Arm (Required)	7" Arm (Standard)
GLEON-AF-06	10" Extended Arm (Required)	7" Arm (Standard)
GLEON-AF-07	13" Extended Arm (Required)	13" Extended Arm (Required)
GLEON-AF-08	13" Extended Arm (Required)	13" Extended Arm (Required)
GLEON-AF-09	16" Extended Arm (Required)	16" Extended Arm (Required)
GLEON-AF-10	16" Extended Arm (Required)	16" Extended Arm (Required)

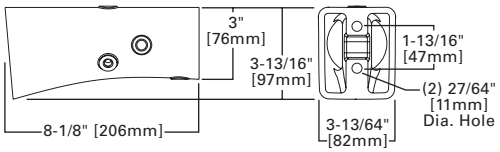


NOTES: 1 Round poles are 3 @ 120°. Square poles are 3 @ 90°. **2** Round poles are 3 @ 90°.

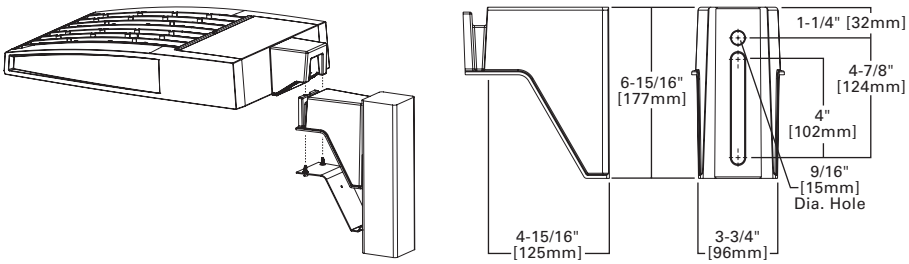
STANDARD WALL MOUNT



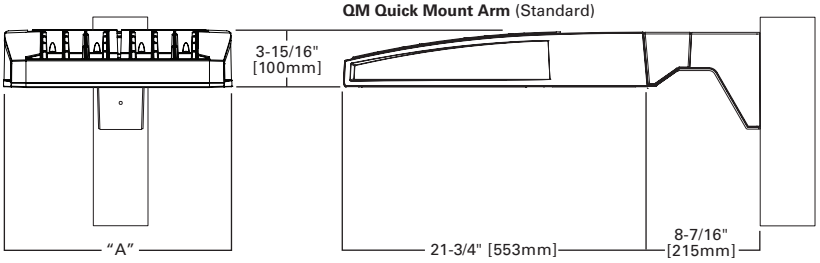
MAST ARM MOUNT



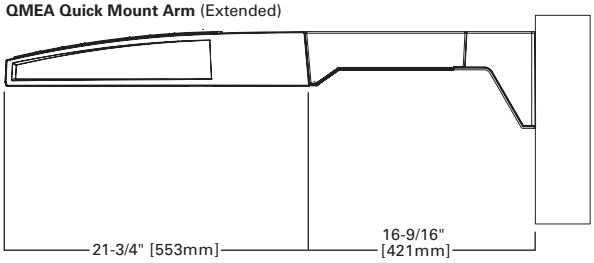
QUICK MOUNT ARM (INCLUDES FIXTURE ADAPTER)



QM Quick Mount Arm (Standard)



QMEA Quick Mount Arm (Extended)



QUICK MOUNT ARM DATA

Number of Light Squares [1,2]	"A" Width	Weight with QM Arm (lbs.)	Weight with QMEA Arm (lbs.)	EPA (Sq. Ft.)
1-4	15-1/2" (394mm)	35 (15.91 kgs.)	38 (17.27 kgs.)	1.11
5-6 [3]	21-5/8" (549mm)	46 (20.91 kgs.)	49 (22.27 kgs.)	
7-8	27-5/8" (702mm)	56 (25.45 kgs.)	59 (26.82 kgs.)	

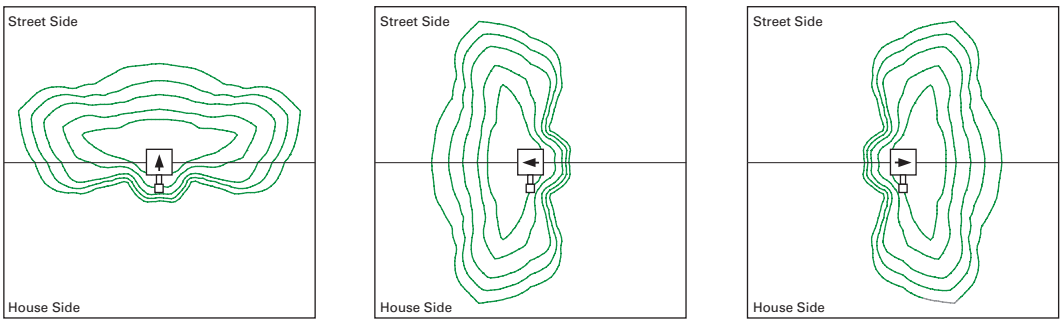
NOTES: 1 QM option available with 1-8 light square configurations. **2** QMEA option available with 1-6 light square configurations. **3** QMEA arm to be used when mounting two fixtures at 90° on a single pole.

Powering Business Worldwide

Eaton
1121 Highway 74 South
Peachtree City, GA 30269
P: 770-486-4800
www.eaton.com/lighting

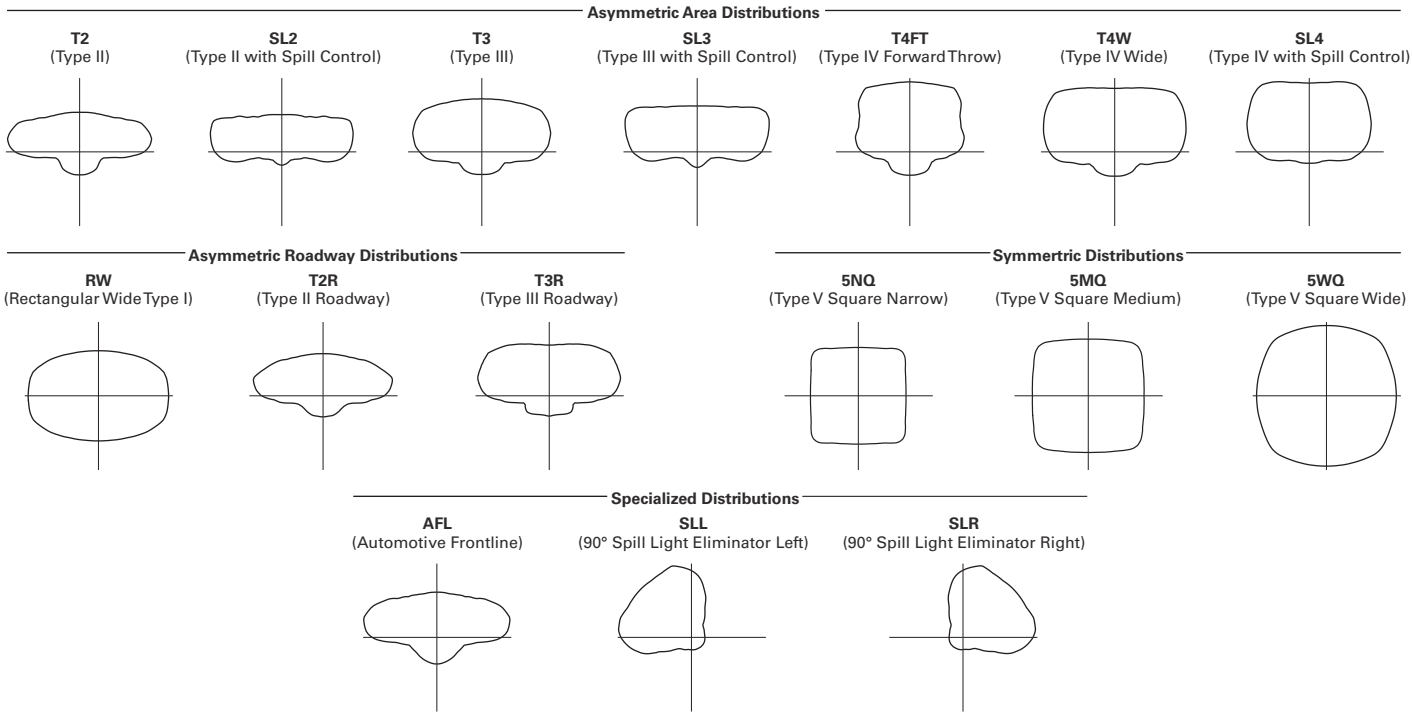
Specifications and dimensions subject to change without notice.

OPTIC ORIENTATION



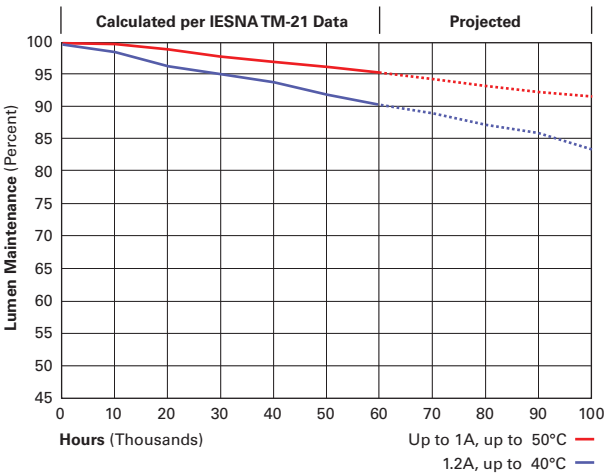
Standard | **Optics Rotated Left @ 90°** [L90] | **Optics Rotated Right @ 90°** [R90]

OPTICAL DISTRIBUTIONS



LUMEN MAINTENANCE

Drive Current	Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Projected L70 (Hours)
Up to 1A	Up to 50°C	> 95%	416,000
1.2A	Up to 40°C	> 90%	205,000



LUMEN MULTIPLIER

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

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NOMINAL POWER LUMENS (1.2A)

Number of Light Squares		1	2	3	4	5	6	7	8	9	10
Nominal Power (Watts)		67	129	191	258	320	382	448	511	575	640
Input Current @ 120V (A)		0.58	1.16	1.78	2.31	2.94	3.56	4.09	4.71	5.34	5.87
Input Current @ 208V (A)		0.33	0.63	0.93	1.27	1.57	1.87	2.22	2.52	2.8	3.14
Input Current @ 240V (A)		0.29	0.55	0.80	1.10	1.35	1.61	1.93	2.18	2.41	2.71
Input Current @ 277V (A)		0.25	0.48	0.70	0.96	1.18	1.39	1.69	1.90	2.09	2.36
Input Current @ 347V (A)		0.20	0.39	0.57	0.78	0.96	1.15	1.36	1.54	1.72	1.92
Input Current @ 480V (A)		0.15	0.30	0.43	0.60	0.73	0.85	1.03	1.16	1.28	1.45
Optics											
T2	4000K/5000K Lumens	6,709	13,111	19,562	25,848	32,026	38,325	45,324	51,355	57,286	63,424
	3000K Lumens	5,939	11,606	17,316	22,881	28,349	33,925	40,121	45,459	50,710	56,143
	BUG Rating	B1-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
T2R	4000K/5000K Lumens	7,122	13,919	20,769	27,442	34,000	40,687	48,117	54,519	60,816	67,333
	3000K Lumens	5,939	11,606	17,316	22,881	28,349	33,925	40,121	45,459	50,710	56,143
	BUG Rating	B1-U0-G1	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5
T3	4000K/5000K Lumens	6,838	13,363	19,939	26,346	32,642	39,062	46,196	52,343	58,388	64,646
	3000K Lumens	6,053	11,829	17,650	23,321	28,895	34,578	40,893	46,334	51,685	57,225
	BUG Rating	B1-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
T3R	4000K/5000K Lumens	6,990	13,660	20,382	26,931	33,368	39,930	47,223	53,506	59,686	66,081
	3000K Lumens	6,188	12,092	18,042	23,839	29,537	35,346	41,802	47,364	52,834	58,495
	BUG Rating	B1-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5
T4FT	4000K/5000K Lumens	6,878	13,440	20,055	26,499	32,832	39,289	46,464	52,646	58,726	65,020
	3000K Lumens	6,088	11,897	17,753	23,457	29,063	34,779	41,130	46,602	51,984	57,556
	BUG Rating	B1-U0-G2	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
T4W	4000K/5000K Lumens	6,789	13,267	19,795	26,156	32,408	38,781	45,864	51,967	57,968	64,180
	3000K Lumens	6,010	11,744	17,523	23,153	28,688	34,329	40,599	46,001	51,313	56,812
	BUG Rating	B1-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
SL2	4000K/5000K Lumens	6,697	13,088	19,529	25,804	31,970	38,259	45,245	51,267	57,186	63,315
	3000K Lumens	5,928	11,585	17,287	22,842	28,300	33,867	40,051	45,382	50,621	56,046
	BUG Rating	B1-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
SL3	4000K/5000K Lumens	6,837	13,361	19,936	26,342	32,639	39,057	46,189	52,336	58,380	64,636
	3000K Lumens	6,052	11,827	17,647	23,318	28,892	34,573	40,887	46,328	51,678	57,216
	BUG Rating	B1-U0-G2	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
SL4	4000K/5000K Lumens	6,496	12,695	18,943	25,029	31,011	37,110	43,886	49,727	55,470	61,414
	3000K Lumens	5,750	11,238	16,768	22,156	27,451	32,850	38,848	44,018	49,102	54,364
	BUG Rating	B1-U0-G2	B1-U0-G3	B2-U0-G4	B2-U0-G4	B2-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
5NQ	4000K/5000K Lumens	7,052	13,781	20,564	27,171	33,664	40,285	47,641	53,981	60,215	66,669
	3000K Lumens	6,242	12,199	18,203	24,052	29,799	35,660	42,172	47,784	53,302	59,015
	BUG Rating	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4
5MQ	4000K/5000K Lumens	7,182	14,034	20,942	27,671	34,284	41,027	48,518	54,975	61,323	67,896
	3000K Lumens	6,358	12,423	18,538	24,494	30,348	36,317	42,948	48,664	54,283	60,102
	BUG Rating	B3-U0-G1	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G5	B5-U0-G5	B5-U0-G5
5WQ	4000K/5000K Lumens	7,201	14,073	20,998	27,744	34,375	41,136	48,648	55,121	61,487	68,077
	3000K Lumens	6,374	12,457	18,587	24,559	30,429	36,414	43,063	48,793	54,428	60,262
	BUG Rating	B3-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G5	B5-U0-G5	B5-U0-G5	B5-U0-G5
SLL/SLR	4000K/5000K Lumens	6,009	11,741	17,519	23,148	28,681	34,321	40,589	45,990	51,301	56,798
	3000K Lumens	5,319	10,393	15,508	20,491	25,388	30,381	35,929	40,710	45,412	50,278
	BUG Rating	B1-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B4-U0-G5
RW	4000K/5000K Lumens	6,989	13,657	20,378	26,925	33,360	39,921	47,211	53,494	59,672	66,066
	3000K Lumens	6,187	12,089	18,039	23,834	29,530	35,338	41,791	47,353	52,822	58,482
	BUG Rating	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G4
AFL	4000K/5000K Lumens	7,014	13,706	20,452	27,023	33,481	40,066	47,383	53,688	59,888	66,306
	3000K Lumens	6,209	12,133	18,104	23,921	29,637	35,466	41,943	47,525	53,013	58,694
	BUG Rating	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B4-U0-G4	B4-U0-G4

* Nominal data for 70 CRI.

NOMINAL POWER LUMENS (1A)

Number of Light Squares		1	2	3	4	5	6	7	8	9	10
Nominal Power (Watts)		59	113	166	225	279	333	391	445	501	558
Input Current @ 120V (A)		0.51	1.02	1.53	2.03	2.55	3.06	3.56	4.08	4.6	5.07
Input Current @ 208V (A)		0.29	0.56	0.82	1.11	1.37	1.64	1.93	2.19	2.46	2.75
Input Current @ 240V (A)		0.26	0.48	0.71	0.96	1.19	1.41	1.67	1.89	2.12	2.39
Input Current @ 277V (A)		0.23	0.42	0.61	0.83	1.03	1.23	1.45	1.65	1.84	2.09
Input Current @ 347V (A)		0.17	0.32	0.50	0.64	0.82	1.00	1.14	1.32	1.50	1.68
Input Current @ 480V (A)		0.14	0.24	0.37	0.48	0.61	0.75	0.91	0.99	1.12	1.28
Optics											
T2	4000K/5000K Lumens	6,116	11,951	17,833	23,563	29,195	34,937	41,317	46,814	52,221	57,817
	3000K Lumens	5,414	10,579	15,786	20,858	25,843	30,926	36,574	41,440	46,226	51,180
	BUG Rating	B1-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
T2R	4000K/5000K Lumens	6,493	12,688	18,932	25,015	30,994	37,090	43,863	49,699	55,439	61,380
	3000K Lumens	5,748	11,231	16,759	22,143	27,436	32,832	38,828	43,994	49,075	54,334
	BUG Rating	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B4-U0-G5	B4-U0-G5
T3	4000K/5000K Lumens	6,234	12,181	18,176	24,017	29,756	35,609	42,111	47,715	53,225	58,930
	3000K Lumens	5,518	10,783	16,089	21,260	26,340	31,521	37,277	42,237	47,115	52,165
	BUG Rating	B1-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
T3R	4000K/5000K Lumens	6,372	12,453	18,580	24,550	30,418	36,400	43,048	48,776	54,409	60,239
	3000K Lumens	5,640	11,023	16,447	21,732	26,926	32,221	38,106	43,177	48,163	53,324
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B4-U0-G5
T4FT	4000K/5000K Lumens	6,270	12,252	18,282	24,156	29,929	35,815	42,356	47,992	53,534	59,271
	3000K Lumens	5,550	10,845	16,183	21,383	26,493	31,703	37,494	42,483	47,388	52,467
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5
T4W	4000K/5000K Lumens	6,189	12,094	18,045	23,844	29,543	35,352	41,809	47,372	52,843	58,506
	3000K Lumens	5,479	10,706	15,973	21,107	26,151	31,294	37,009	41,934	46,777	51,790
	BUG Rating	B1-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G4	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
SL2	4000K/5000K Lumens	6,105	11,931	17,803	23,522	29,144	34,877	41,245	46,734	52,130	57,717
	3000K Lumens	5,404	10,561	15,759	20,822	25,798	30,873	36,510	41,369	46,145	51,091
	BUG Rating	B1-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
SL3	4000K/5000K Lumens	6,233	12,180	18,174	24,013	29,753	35,604	42,106	47,708	53,218	58,921
	3000K Lumens	5,517	10,782	16,088	21,256	26,337	31,517	37,272	42,231	47,109	52,157
	BUG Rating	B1-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5
SL4	4000K/5000K Lumens	5,922	11,572	17,268	22,816	28,269	33,829	40,006	45,330	50,566	55,984
	3000K Lumens	5,242	10,244	15,286	20,197	25,024	29,945	35,413	40,126	44,761	49,557
	BUG Rating	B1-U0-G2	B1-U0-G3	B2-U0-G3	B2-U0-G4	B2-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
5NQ	4000K/5000K Lumens	6,429	12,563	18,746	24,768	30,688	36,723	43,429	49,208	54,891	60,775
	3000K Lumens	5,691	11,121	16,594	21,925	27,165	32,507	38,443	43,559	48,590	53,798
	BUG Rating	B2-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4
5MQ	4000K/5000K Lumens	6,547	12,794	19,090	25,224	31,253	37,400	44,228	50,114	55,902	61,893
	3000K Lumens	5,795	11,325	16,898	22,328	27,665	33,106	39,151	44,361	49,484	54,788
	BUG Rating	B3-U0-G1	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G5	B5-U0-G5
5WQ	4000K/5000K Lumens	6,564	12,828	19,141	25,291	31,336	37,499	44,347	50,248	56,051	62,058
	3000K Lumens	5,810	11,355	16,944	22,388	27,739	33,194	39,256	44,480	49,616	54,934
	BUG Rating	B3-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G5	B5-U0-G5	B5-U0-G5	B5-U0-G5
SLL/SLR	4000K/5000K Lumens	5,478	10,703	15,970	21,102	26,145	31,286	37,001	41,924	46,765	51,777
	3000K Lumens	4,849	9,474	14,137	18,679	23,144	27,694	32,753	37,111	41,396	45,833
	BUG Rating	B1-U0-G2	B1-U0-G3	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
RW	4000K/5000K Lumens	6,371	12,449	18,576	24,544	30,411	36,392	43,037	48,764	54,396	60,225
	3000K Lumens	5,640	11,020	16,443	21,726	26,920	32,214	38,096	43,166	48,151	53,311
	BUG Rating	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4
AFL	4000K/5000K Lumens	6,394	12,494	18,644	24,634	30,521	36,524	43,194	48,942	54,593	60,444
	3000K Lumens	5,660	11,060	16,504	21,806	27,017	32,331	38,235	43,323	48,326	53,505
	BUG Rating	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B4-U0-G4	B4-U0-G4

* Nominal data for 70 CRI.

NOMINAL POWER LUMENS (800MA)

Number of Light Squares		1	2	3	4	5	6	7	8	9	10
Nominal Power (Watts)		44	85	124	171	210	249	295	334	374	419
Input Current @ 120V (A)		0.39	0.77	1.13	1.54	1.90	2.26	2.67	3.03	3.39	3.80
Input Current @ 208V (A)		0.22	0.44	0.62	0.88	1.06	1.24	1.50	1.68	1.87	2.12
Input Current @ 240V (A)		0.19	0.38	0.54	0.76	0.92	1.08	1.30	1.46	1.62	1.84
Input Current @ 277V (A)		0.17	0.36	0.47	0.72	0.83	0.95	1.19	1.31	1.42	1.67
Input Current @ 347V (A)		0.15	0.24	0.38	0.49	0.63	0.77	0.87	1.01	1.15	1.52
Input Current @ 480V (A)		0.11	0.18	0.29	0.37	0.48	0.59	0.66	0.77	0.88	0.96
Optics											
T2	4000K/5000K Lumens	4,941	9,656	14,408	19,038	23,588	28,227	33,382	37,823	42,191	46,713
	3000K Lumens	4,374	8,547	12,754	16,852	20,880	24,987	29,550	33,481	37,347	41,350
	BUG Rating	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B4-U0-G5	B4-U0-G5
T2R	4000K/5000K Lumens	5,246	10,251	15,296	20,211	25,041	29,966	35,439	40,154	44,791	49,592
	3000K Lumens	4,644	9,074	13,540	17,891	22,166	26,526	31,371	35,544	39,649	43,899
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5
T3	4000K/5000K Lumens	5,037	9,842	14,685	19,404	24,041	28,770	34,024	38,551	43,003	47,612
	3000K Lumens	4,459	8,712	12,999	17,176	21,281	25,467	30,118	34,125	38,066	42,146
	BUG Rating	B1-U0-G1	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B4-U0-G5	B4-U0-G5
T3R	4000K/5000K Lumens	5,148	10,061	15,011	19,835	24,576	29,409	34,780	39,408	43,959	48,669
	3000K Lumens	4,557	8,906	13,288	17,558	21,755	26,033	30,787	34,884	38,913	43,082
	BUG Rating	B1-U0-G2	B1-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
T4FT	4000K/5000K Lumens	5,066	9,899	14,770	19,516	24,181	28,936	34,221	38,774	43,252	47,888
	3000K Lumens	4,484	8,763	13,074	17,276	21,405	25,614	30,292	34,323	38,287	42,390
	BUG Rating	B1-U0-G2	B1-U0-G2	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
T4W	4000K/5000K Lumens	5,000	9,771	14,579	19,264	23,869	28,562	33,779	38,274	42,694	47,269
	3000K Lumens	4,426	8,649	12,905	17,052	21,129	25,283	29,901	33,880	37,793	41,843
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5
SL2	4000K/5000K Lumens	4,933	9,639	14,383	19,005	23,547	28,178	33,324	37,758	42,118	46,632
	3000K Lumens	4,367	8,532	12,732	16,823	20,844	24,943	29,498	33,423	37,283	41,279
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B4-U0-G5	B4-U0-G5
SL3	4000K/5000K Lumens	5,036	9,841	14,683	19,401	24,039	28,766	34,019	38,546	42,997	47,605
	3000K Lumens	4,458	8,711	12,997	17,174	21,279	25,464	30,114	34,121	38,061	42,140
	BUG Rating	B1-U0-G2	B1-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
SL4	4000K/5000K Lumens	4,784	9,350	13,951	18,434	22,840	27,332	32,323	36,624	40,854	45,232
	3000K Lumens	4,235	8,277	12,349	16,318	20,218	24,194	28,612	32,420	36,164	40,039
	BUG Rating	B1-U0-G2	B1-U0-G3	B1-U0-G3	B2-U0-G4	B2-U0-G4	B2-U0-G5	B2-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
5NQ	4000K/5000K Lumens	5,194	10,150	15,145	20,011	24,794	29,670	35,088	39,757	44,349	49,102
	3000K Lumens	4,598	8,985	13,406	17,714	21,948	26,264	31,060	35,193	39,258	43,465
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G3
5MQ	4000K/5000K Lumens	5,290	10,337	15,424	20,380	25,250	30,217	35,734	40,489	45,165	50,006
	3000K Lumens	4,683	9,150	13,653	18,040	22,351	26,748	31,632	35,841	39,980	44,265
	BUG Rating	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G4
5WQ	4000K/5000K Lumens	5,304	10,365	15,465	20,434	25,318	30,297	35,830	40,597	45,286	50,139
	3000K Lumens	4,695	9,175	13,690	18,088	22,411	26,819	31,717	35,936	40,087	44,383
	BUG Rating	B3-U0-G1	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G5	B5-U0-G5
SLL/SLR	4000K/5000K Lumens	4,426	8,648	12,903	17,049	21,124	25,278	29,894	33,872	37,784	41,832
	3000K Lumens	3,918	7,655	11,422	15,092	18,699	22,376	26,462	29,983	33,446	37,030
	BUG Rating	B1-U0-G2	B1-U0-G2	B2-U0-G3	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
RW	4000K/5000K Lumens	5,147	10,058	15,009	19,830	24,570	29,402	34,771	39,399	43,949	48,658
	3000K Lumens	4,556	8,903	13,286	17,554	21,749	26,027	30,779	34,876	38,904	43,072
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4
AFL	4000K/5000K Lumens	5,166	10,095	15,063	19,903	24,659	29,509	34,898	39,542	44,108	48,835
	3000K Lumens	4,573	8,936	13,334	17,618	21,828	26,121	30,892	35,003	39,044	43,229
	BUG Rating	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3

* Nominal data for 70 CRI.

NOMINAL POWER LUMENS (600MA)

Number of Light Squares		1	2	3	4	5	6	7	8	9	10
Nominal Power (Watts)		34	66	96	129	162	193	226	257	290	323
Input Current @ 120V (A)		0.30	0.58	0.86	1.16	1.44	1.73	2.03	2.33	2.59	2.89
Input Current @ 208V (A)		0.17	0.34	0.49	0.65	0.84	0.99	1.14	1.30	1.48	1.63
Input Current @ 240V (A)		0.15	0.30	0.43	0.56	0.74	0.87	1.00	1.13	1.30	1.43
Input Current @ 277V (A)		0.14	0.28	0.41	0.52	0.69	0.81	0.93	1.04	1.22	1.33
Input Current @ 347V (A)		0.11	0.19	0.30	0.39	0.49	0.60	0.69	0.77	0.90	0.99
Input Current @ 480V (A)		0.08	0.15	0.24	0.30	0.38	0.48	0.53	0.59	0.71	0.77
Optics											
T2	4000K/5000K Lumens	4,029	7,874	11,749	15,525	19,235	23,019	27,222	30,844	34,406	38,093
	3000K Lumens	3,566	6,970	10,400	13,743	17,027	20,376	24,097	27,303	30,456	33,720
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4
T2R	4000K/5000K Lumens	4,278	8,360	12,474	16,482	20,421	24,437	28,900	32,745	36,527	40,441
	3000K Lumens	3,787	7,400	11,042	14,590	18,077	21,632	25,582	28,986	32,334	35,798
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4
T3	4000K/5000K Lumens	4,107	8,026	11,976	15,824	19,605	23,461	27,746	31,438	35,068	38,827
	3000K Lumens	3,636	7,105	10,601	14,007	17,354	20,768	24,561	27,829	31,042	34,370
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
T3R	4000K/5000K Lumens	4,198	8,205	12,242	16,175	20,041	23,982	28,363	32,137	35,848	39,689
	3000K Lumens	3,716	7,263	10,837	14,318	17,740	21,229	25,107	28,448	31,733	35,133
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
T4FT	4000K/5000K Lumens	4,131	8,072	12,045	15,915	19,719	23,597	27,907	31,620	35,272	39,052
	3000K Lumens	3,657	7,145	10,662	14,088	17,455	20,888	24,703	27,990	31,223	34,569
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5
T4W	4000K/5000K Lumens	4,077	7,968	11,889	15,710	19,465	23,292	27,546	31,212	34,816	38,547
	3000K Lumens	3,609	7,053	10,524	13,906	17,230	20,618	24,384	27,629	30,819	34,122
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5
SL2	4000K/5000K Lumens	4,022	7,861	11,729	15,498	19,202	22,979	27,175	30,791	34,347	38,028
	3000K Lumens	3,560	6,959	10,383	13,719	16,998	20,341	24,055	27,256	30,404	33,662
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
SL3	4000K/5000K Lumens	4,106	8,025	11,974	15,821	19,603	23,458	27,742	31,433	35,064	38,821
	3000K Lumens	3,635	7,104	10,599	14,005	17,353	20,765	24,557	27,824	31,039	34,364
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G3	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
SL4	4000K/5000K Lumens	3,902	7,624	11,377	15,033	18,626	22,289	26,359	29,867	33,316	36,886
	3000K Lumens	3,454	6,749	10,071	13,307	16,488	19,730	23,333	26,438	29,491	32,651
	BUG Rating	B1-U0-G2	B1-U0-G2	B1-U0-G3	B1-U0-G3	B2-U0-G4	B2-U0-G4	B2-U0-G4	B2-U0-G5	B3-U0-G5	B3-U0-G5
5NQ	4000K/5000K Lumens	4,236	8,277	12,351	16,319	20,219	24,196	28,614	32,422	36,166	40,042
	3000K Lumens	3,750	7,327	10,933	14,446	17,898	21,418	25,329	28,700	32,014	35,445
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G2	B5-U0-G3	B5-U0-G3
5MQ	4000K/5000K Lumens	4,314	8,429	12,578	16,619	20,591	24,641	29,141	33,019	36,832	40,779
	3000K Lumens	3,819	7,461	11,134	14,711	18,227	21,812	25,796	29,228	32,604	36,098
	BUG Rating	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4
5WQ	4000K/5000K Lumens	4,325	8,452	12,611	16,664	20,646	24,707	29,219	33,106	36,930	40,888
	3000K Lumens	3,828	7,482	11,163	14,751	18,276	21,871	25,865	29,305	32,690	36,194
	BUG Rating	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G4
SLL/SLR	4000K/5000K Lumens	3,609	7,052	10,522	13,903	17,226	20,613	24,378	27,622	30,812	34,114
	3000K Lumens	3,195	6,242	9,314	12,307	15,248	18,247	21,579	24,451	27,275	30,198
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
RW	4000K/5000K Lumens	4,197	8,202	12,239	16,171	20,036	23,977	28,356	32,129	35,839	39,680
	3000K Lumens	3,715	7,260	10,834	14,315	17,736	21,224	25,101	28,441	31,725	35,125
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3
AFL	4000K/5000K Lumens	4,213	8,232	12,284	16,230	20,109	24,064	28,459	32,246	35,969	39,824
	3000K Lumens	3,729	7,287	10,874	14,367	17,800	21,301	25,192	28,544	31,840	35,252
	BUG Rating	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3

* Nominal data for 70 CRI.

CONTROL OPTIONS

0-10V (DIM)
This fixture is offered standard with 0-10V dimming driver(s). The DIM option provides 0-10V dimming wire leads for use with a lighting control panel or other control method.

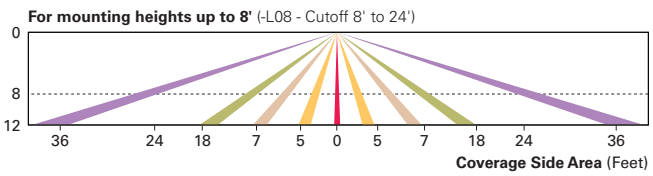
Photocontrol (P, R and PER7)
Optional button-type photocontrol (P) and photocontrol receptacles (R and PER7) provide a flexible solution to enable "dusk-to-dawn" lighting by sensing light levels. Advanced control systems compatible with NEMA 7-pin standards can be utilized with the PER7 receptacle.

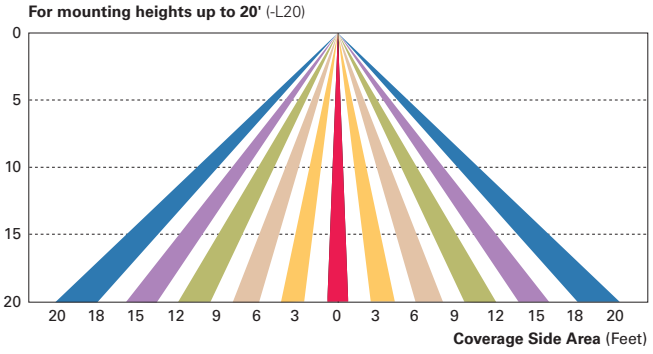
After Hours Dim (AHD)
This feature allows photocontrol-enabled luminaires to achieve additional energy savings by dimming during scheduled portions of the night. The dimming profile will automatically take effect after a "dusk-to-dawn" period has been calculated from the photocontrol input. Specify the desired dimming profile for a simple, factory-shipped dimming solution requiring no external control wiring. Reference the After Hours Dim supplemental guide for additional information.

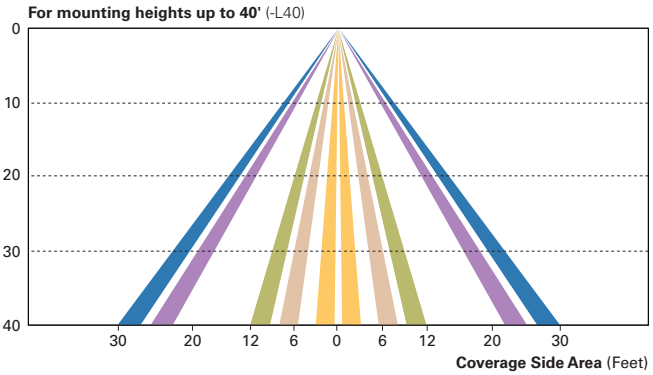
Dimming Occupancy Sensor (MS/DIM-LXX, MS/X-LXX and MS-LXX)
These sensors are factory installed in the luminaire housing. When the MS/DIM-LXX sensor option is selected, the occupancy sensor is connected to a dimming driver and the entire luminaire dims when there is no activity detected. When activity is detected, the luminaire returns to full light output. The MS/DIM sensor is factory preset to dim down to approximately 50 percent power with a time delay of five minutes. The MS-LXX sensor is factory preset to turn the luminaire off after five minutes of no activity. The MS/X-LXX is also preset for five minutes and only controls the specified number of light engines to maintain steady output from the remaining light engines.

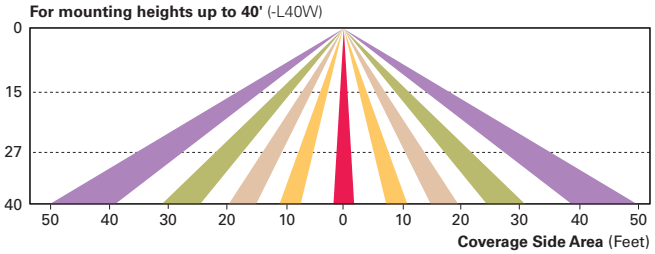
These occupancy sensors includes an integral photocell that can be activated with the FSIR-100 accessory for "dusk-to-dawn" control or daylight harvesting - the factory preset is OFF. The FSIR-100 is a wireless tool utilized for changing the dimming level, time delay, sensitivity and other parameters.

A variety of sensor lens are available to optimize the coverage pattern for mounting heights from 8'-40'.



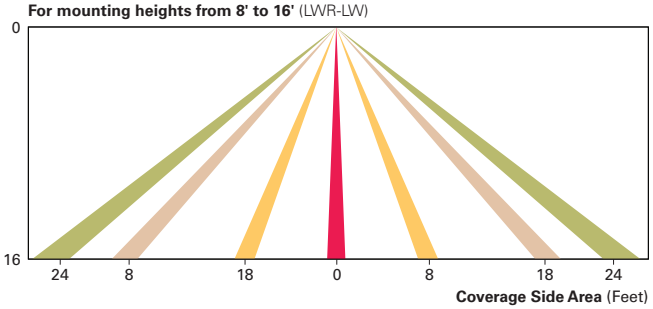


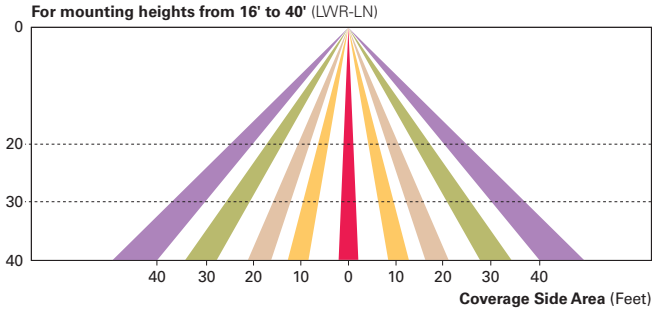




LumaWatt Wireless Control and Monitoring System (LWR-LW and LWR-LN)
The LumaWatt system is a peer-to-peer wireless network of luminaire-integral sensors for any sized project. Each sensor is capable of motion and photo sensing, metering power consumption and wireless communication. The end-user can securely create and manage sensor profiles with browser-based management software. The software will automatically broadcast to the sensors via wireless gateways for zone-based and individual luminaire control. The LumaWatt software provides smart building solutions by utilizing the sensor to provide easy-to-use dashboard and analytic capabilities such as improved energy savings, traffic flow analysis, building management software integration and more.

For additional details, refer to the LumaWatt product guides.





ORDERING INFORMATION

Sample Number: GLEON-AF-04-LED-E1-T3-GM-QM

Product Family [1, 2]	Light Engine	Number of Light Squares [3]	Lamp Type	Voltage	Distribution	Color	Mounting
GLEON=Galleon	**AF**=1A Drive Current	**01**=1 **02**=2 **03**=3 **04**=4 **05**=5 **06**=6 **07**=7 [4] **08**=8 [4] **09**=9 [5] **10**=10 [5]	**LED**=Solid State Light Emitting Diodes	**E1**=120-277V **347**=347V [6] **480**=480V [6, 7]	**T2**=Type II **T2R**=Type II Roadway **T3**=Type III **T3R**=Type III Roadway **T4FT**=Type IV Forward Throw **T4W**=Type IV Wide **5NQ**=Type V Narrow **5MQ**=Type V Square Medium **5WQ**=Type V Square Wide **SL2**=Type II w/Spill Control **SL3**=Type III w/Spill Control **SL4**=Type IV w/Spill Control **SLL**=90° Spill Light Eliminator Left **SLR**=90° Spill Light Eliminator Right **RW**=Rectangular Wide Type I **AFL**=Automotive Frontline	**AP**=Grey **BZ**=Bronze **BK**=Black **DP**=Dark Platinum **GM**=Graphite Metallic **WH**=White	**[Blank]**=Arm for Round or Square Pole **EA**=Extended Arm [8] **MA**=Mast Arm Adapter [9] **WM**=Wall Mount **QM**=Quick Mount Arm (Standard Length) [10] **QMEA**=Quick Mount Arm (Extended Length) [11]

Options (Add as Suffix)

7030=70 CRI 3000K [12]
8030=80 CRI 3000K [13]
7050=70 CRI 5000K [12]
7060=70 CRI 6000K [12]
600=Drive Current Factory Set to Nominal 600mA [14]
800=Drive Current Factory Set to Nominal 800mA [14]
1200=Drive Current Factory Set to Nominal 1200mA [14, 15]
F=Single Fuse (120, 277 or 347V. Must Specify Voltage)
FF=Double Fuse (208, 240 or 480V. Must Specify Voltage)
2L=Two Circuits [16, 17]
DIM=External 0-10V Dimming Leads
P=Button Type Photocontrol (120, 208, 240 or 277V. Must Specify Volatage)
PER7=NEMA 7-PIN Twistlock Photocontrol Receptacle
R=NEMA Twistlock Photocontrol Receptacle
AHD145=After Hours Dim, 5 Hours [18]
AHD245=After Hours Dim, 6 Hours [18]
AHD255=After Hours Dim, 7 Hours [18]
AHD355=After Hours Dim, 8 Hours [18]
HA=50°C High Ambient [19]
MS/DIM-L08=Motion Sensor for Dimming Operation, Maximum 8' Mounting Height [20, 21]
MS/DIM-L20=Motion Sensor for Dimming Operation, 9' - 20' Mounting Height [20, 22]
MS/DIM-L40=Motion Sensor for Dimming Operation, 21' - 40' Mounting Height [20, 23]
MS/DIM-L40W=Motion Sensor for Dimming Operation, 21' - 40' Mounting Height (Wide Range) [20, 24]
MS/X-L08=Bi-Level Motion Sensor, Maximum 8' Mounting Height [20, 21, 25]
MS/X-L20=Bi-Level Motion Sensor, 9' - 20' Mounting Height [20, 22, 25]
MS/X-L40=Bi-Level Motion Sensor, 21' - 40' Mounting Height [20, 23, 25]
MS/X-L40W=Bi-Level Motion Sensor, 21' - 40' Mounting Height (Wide Range) [20, 24, 25]
MS-L08=Motion Sensor for ON/OFF Operation, Maximum 8' Mounting Height [20, 21]
MS-L20=Motion Sensor for ON/OFF Operation, 9' - 20' Mounting Height [20, 22]
MS-L40=Motion Sensor for ON/OFF Operation, 21' - 40' Mounting Height [20, 23]
MS-L40W=Motion Sensor for ON/OFF Operation, 21' - 40' Mounting Height (Wide Range) [20, 24]
LWR-LW=LumaWatt Wireless Sensor, Wide Lens for 8' - 16' Mounting Height [26]
LWR-LN=LumaWatt Wireless Sensor, Narrow Lens for 16' - 40' Mounting Height [26]
L90=Optics Rotated 90° Left
R90=Optics Rotated 90° Right
MT=Factory Installed Mesh Top
TH=Tool-less Door Hardware
LCF=Light Square Trim Plate Painted to Match Housing [27]
HSS=Factory Installed House Side Shield [28]
CE=CE Marking [29]

Accessories (Order Separately)

OA/RA1016=NEMA Photocontrol Multi-Tap - 105-285V
OA/RA1027=NEMA Photocontrol - 480V
OA/RA1201=NEMA Photocontrol - 347V
OA/RA1013=Photocontrol Shorting Cap
OA/RA1014=120V Photocontrol
MA1252=10kV Surge Module Replacement
MA1036-XX=Single Tenon Adapter for 2-3/8" O.D. Tenon
MA1037-XX=2@180° Tenon Adapter for 2-3/8" O.D. Tenon
MA1197-XX=3@120° Tenon Adapter for 2-3/8" O.D. Tenon
MA1188-XX=4@90° Tenon Adapter for 2-3/8" O.D. Tenon
MA1189-XX=2@90° Tenon Adapter for 2-3/8" O.D. Tenon
MA1190-XX=3@90° Tenon Adapter for 2-3/8" O.D. Tenon
MA1191-XX=2@120° Tenon Adapter for 2-3/8" O.D. Tenon
MA1038-XX=Single Tenon Adapter for 3-1/2" O.D. Tenon
MA1039-XX=2@180° Tenon Adapter for 3-1/2" O.D. Tenon
MA1192-XX=3@120° Tenon Adapter for 3-1/2" O.D. Tenon
MA1193-XX=4@90° Tenon Adapter for 3-1/2" O.D. Tenon
MA1194-XX=2@90° Tenon Adapter for 3-1/2" O.D. Tenon
MA1195-XX=3@90° Tenon Adapter for 3-1/2" O.D. Tenon
FSIR-100=Wireless Configuration Tool for Occupancy Sensor [20]
GLEON-MT1=Field Installed Mesh Top for 1-4 Light Squares
GLEON-MT2=Field Installed Mesh Top for 5-6 Light Squares
GLEON-MT3=Field Installed Mesh Top for 7-8 Light Squares
GLEON-MT4=Field Installed Mesh Top for 9-10 Light Squares
GLEON-QM=Quick Mount Arm Kit
GLEON-QMEA=Quick Mount Extended Arm Kit
LS/HSS=Field Installed House Side Shield [28, 30]

NOTES:
1. Customer is responsible for engineering analysis to confirm pole and fixture compatibility for all applications. Refer to our white paper WP513001EN for additional support information.
2. DesignLights Consortium™ Qualified. Refer to www.designlights.org Qualified Products List under Family Models for details.
3. Standard 4000K CCT and minimum 70 CRI.
4. Not compatible with extended quick mount arm (QMEA).
5. Not compatible with standard quick mount arm (QM) or extended quick mount arm (QMEA).
6. Requires the use of an internal step down transformer when combined with sensor options. Not available with sensor at 1200mA. Not available in combination with the HA high ambient and sensor options at 1A.
7. Only for use with 480V Wye systems. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems).
8. May be required when two or more luminaires are oriented on a 90° or 120° drilling pattern. Refer to arm mounting requirement table.
9. Factory installed.
10. Maximum 8 light squares.
11. Maximum 6 light squares.
12. Extended lead times apply. Use dedicated IES files for 3000K, 5000K and 6000K when performing layouts. These files are published on the Galleon luminaire product page on the website.
13. Extended lead times apply. Use dedicated IES files for 3000K, 5000K and 6000K when performing layouts. These files are published on the Galleon luminaire product page on the website.
14. 1 Amp standard. Use dedicated IES files for 600mA, 800mA and 1200mA when performing layouts. These files are published on the Galleon luminaire product page on the website.
15. Not available with HA option.
16. 2L is not available with MS, MS/X or MS/DIM at 347V or 480V. 2L in AF-02 through AF-04 requires a larger housing, normally used for AF-05 or AF-06. Extended arm option may be required when mounting two or more fixtures per pole at 90° or 120°. Refer to arm mounting requirement table.
17. Not available with LumaWatt wireless sensors.
18. Requires the use of P photocontrol or the PER7 or R photocontrol receptacle with photocontrol accessory. See After Hours Dim supplemental guide for additional information.
19. 50°C lumen maintenance data applies to 600mA, 800mA and 1A drive currents.
20. The FSIR-100 configuration tool is required to adjust parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Eaton for more information.
21. Approximately 22' detection diameter at 8' mounting height.
22. Approximately 40' detection diameter at 20' mounting height.
23. Approximately 60' detection diameter at 40' mounting height.
24. Approximately 100' detection diameter at 40' mounting height.
25. Replace X with number of Light Squares operating in low output mode.
26. LumaWatt wireless sensors are factory installed only requiring network components RF-EM-1, RF-GW-1 and RF-ROUT-1 in appropriate quantities. See www.eaton.com/lighting for LumaWatt application information.
27. Not available with house side shield (HSS).
28. Only for use with SL2, SL3, SL4 and AFL distributions. The Light Square trim plate is painted black when the HSS option is selected.
29. CE is not available with the LWR, MS, MS/X, MS/DIM, P, R or PER7 options. Available in 120-277V only.
30. One required for each Light Square.